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AN  
ILLUSTRATED CATALOGUE  
OF THE  
ROTHSCHILD COLLECTION OF NYCTERIBIIDAE



*Publication No. 655*



AN ILLUSTRATED CATALOGUE  
OF THE  
ROTHSCHILD COLLECTION  
OF NYCTERIBIIDAE  
(DIPTERA)  
IN THE  
BRITISH MUSEUM  
(NATURAL HISTORY)

*With keys and short descriptions for the identification of  
subfamilies, genera, species and subspecies*

BY  
OSKAR THEODOR

WITH AN INTRODUCTION BY  
MIRIAM ROTHSCCHILD



TRUSTEES OF  
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*To the memory of Charles Rothschild*







# CONTENTS

INTRODUCTION	<i>page</i> 1
SCOPE OF THE ROTHSCHILD COLLECTION	1
THE BRITISH MUSEUM COLLECTION AND THE SCOPE OF THIS CATALOGUE	1
LISTING THE MATERIAL	2
NUMBER OF SPECIMENS	2
GEOGRAPHICAL DISTRIBUTION	2
PLACE NAMES	3
MIS-LABELLING	3
HOSTS	3
TYPE MATERIAL	5
TERMINOLOGY	5
PHOTOGRAPHS AND TEXT FIGURES	5
ACKNOWLEDGEMENTS	6
EXPLANATION OF ABBREVIATIONS USED IN TEXT AND FIGURES	7
MORPHOLOGY	8
CHAETOTAXY	28
GLOSSARY	31
SYSTEMATICS AND NOMENCLATURE	34
DISTRIBUTION	37
HOST-PARASITE SPECIFICITY	40
MEASUREMENTS	40
TECHNIQUE	41
BIOLOGY	41
DESCRIPTIONS	41

## CONTENTS

REFERENCES	<i>page</i> 42
LIST OF THE FAMILY NYCTERIBIIDAE	43
FAMILY NYCTERIBIIDAE	47
SUBFAMILY NYCTERIBIINAE	50
GENUS NYCTERIBIA	50
GENUS STYLIDIA	116
GENUS BASILIA	192
GENUS STEREOMYIA	338
GENUS HERSHKOVITZIA	345
GENUS PENICILLIDIA	352
SUBFAMILY CYCLOPODIINAE	401
GENUS ARCHINYCTERIBIA	401
GENUS EUCAMPSIPODA	410
GENUS DIPSELIPODA	428
GENUS CYCLOPODIA	437
INSUFFICIENTLY DESCRIBED SPECIES	494
INDEX	497
MAPS OF DISTRIBUTION	501
PLATES 1-5	<i>at end</i>



## INTRODUCTION

### SCOPE OF THE ROTHSCHILD COLLECTION

The collection of Nycteribiidae forms part of Charles Rothschild's collection of ectoparasites which he presented to the British Museum (Natural History) in 1913.\* It includes 67 species (1,595 specimens), 16 of which are new to science and are accordingly represented by their types and paratypes. This figure of 16 is, however, misleading. At the date of the gift there were an additional 40 odd species new to science in the collection which have since been described, 26 by Dr Theodor himself. Thus *Basilina nana* Theodor & Moscona, 1954 was collected by N. C. Rothschild in Hungary in 1908, and Dr Wollaston had sent him specimens of *Dipseliopoda biannulata* and *D. setosa* from the famous Ruwenzori Expedition in 1906, which were described over 40 years later. Charles Rothschild was aware that the collection contained a large number of undescribed species but he had not found time to work them out. He intended in due course to devote several numbers of his journal 'Ectoparasites' to the group, but did not live to carry out his plan.

The collection is essentially a systematist's collection, but unlike the fleas relatively few of the specimens (about 450) are mounted, the majority being stored in alcohol.

Quite a number of the collectors, such as N. Cimballi, Walter Rothschild, E. Hartert, F. J. Cox, A. H. Bishop and W. Holland, were also collectors of fleas from bats. Charles Rothschild was particularly interested in bat parasites, which are as bizarre and peculiar as their hosts, and was always on the look-out for caves and cathedrals which would give him the opportunity of collecting these fascinating animals. His friends, such as A. F. R. Wollaston, Lord Lilford, Karl Jordan, etc., as well as the professional collectors, worked hard and enthusiastically on his behalf. Techniques have improved greatly in recent years and it would come as something of a surprise to realize how great an effort† and how much time was expended on the collection of Nycteribiids and bat fleas.

### THE BRITISH MUSEUM COLLECTION AND THE SCOPE OF THIS CATALOGUE

The British Museum collection of Nycteribiidae (incorporating the Scott material and types of species described by him) is probably the finest in existence. It includes 140 of the 195 known species and subspecies of the family, of which 61 are represented by types (including one of Leach's and several of Bigot's types) and 25 by paratypes. It was therefore thought opportune to

\* For details of the Deed of Gift, see Appendix, p. 357, *An Illustrated Catalogue of the Rothschild Collection of Fleas*, Vol. 1.

† My own contribution to the collection was, on the contrary, an armchair effort. I happened to see a photograph in *The Times* newspaper of a live and rare bat, *Myotis bechsteini*. I immediately telegraphed the owner, Michael Blackmore, and asked him to search the animal for fleas or Nycteribiids. We thus discovered *Basilina nana* and added a third species to the British list, which had been static at two species for over 100 years. This appealed to my peculiar sense of humour since—purely for practical reasons—I had accompanied my father in my cradle at the tender age of 8 weeks on the collecting trip to Hungary on which he found the first specimens of *Basilina nana*. In this connection it is perhaps worth noting that at least seven specimens in the collection were—according to the labels—captured by N. C. Rothschild when he was only 2 years old. If the dates are correct, it seems probable that these specimens were purchased from some other collector or taxidermist such as W. Farren.

## INTRODUCTION

revise the family as a whole, and catalogue not only the Rothschild collection but all the material in the British Museum. This was made possible by our good fortune in persuading Dr Oskar Theodor to undertake this arduous task. In the pages which follow he has revised the classification of the family, described a new genus, a new subgenus and altogether 39 new species and subspecies.

During the revision of the family, some exceedingly interesting material from the Chicago Natural History Museum, mainly from the Oriental and Pacific Regions, was examined. Dr R. Wenzel, Curator of Insects, kindly donated a number of these species to the British Museum. The chief gaps in the collection concern the American species of the genus *Basilis* (only 18 out of 30 species are represented), and new species described from a single example, or a few specimens, from other museums, chiefly in the U.S.A.

## LISTING THE MATERIAL

The specimens are listed in the text, whether mounted or unmounted. This is possible in the case of the Nycteribiids since we are dealing with relatively few specimens. Otherwise, the same procedure as we adopted with regard to the flea collection has been followed with a few minor alterations. In some cases keys to the females are placed before the males, since in this group—unlike almost all the fleas—the diagnostic characters of the female may be superior to those of the males.

It should be noted once again that after Charles Rothschild's death in 1923, material continued to flow in to Dr Jordan from the collectors (several of whom had rather long contracts), which he automatically incorporated in the Rothschild collection, then still housed at Tring. Since Dr Jordan himself had no particular interest in the Nycteribiidae this part of the collection fell off rapidly, so that in fact there are only a few items bearing dates later than 1923.

In quite a number of cases the collector's or donor's name and the specific name of the host are not known. There are also instances in which the number of specimens recorded in the British Museum series is now different from that recorded in some of Dr Theodor's previous publications. This is due principally to two causes:

- (1) Various exchanges have been effected since the date of publication.
- (2) A more critical examination of the material has revealed that more than one species were sheltering under one specific name. It should be noted that the number 'Brit. Mus. 1911. 103' refers to all the specimens collected by Mr Oldfield Thomas from bats he examined for the mammal department of the British Museum.

## NUMBER OF SPECIMENS

Since the total collection numbers less than 3,000 specimens, unlike the fleas of which there are over 22,000, it has been possible to give a complete list of male and female specimens. As we have already indicated, the majority are in alcohol and unmounted.

## GEOGRAPHICAL DISTRIBUTION

Owing to the relatively few records available, it has not been necessary to group them in geographical regions and sub-regions. Under each species is given a general summary of the



## INTRODUCTION

distribution which is based on (a) material in the collection, (b) other material examined by the author. An exception to this rule is made in the case of the American species of *Basilia*; in this instance the distribution cited by Guimarães & d'Andretta (1956) has been accepted.

Although we have not made use of the divisions into the accepted geographical regions, throughout the text we have given consideration to geographical rather than political concepts, and have therefore, for example, used India for the area including India and Pakistan.

## PLACE NAMES

The Royal Geographical Society and Mr I. A. R. Wilkins have kindly assisted us with checking and tracing obscure place names but there are still about a hundred small places we have been unable to locate. Whenever possible we have adopted the orthography used in the Times Atlas (Volume I 1958, Volume II 1959, Volume III 1955, Volume IV 1956, Volume V 1957) and for those places not listed in this work the Columbia Lippincott Gazetteer. About 100 localities, nevertheless, have not been identified with certainty, although in many cases their position can be roughly ascertained, if not pin-pointed, by the additional data on the label: although Olive River does not appear on either of the maps in question, the fact that it is flowing somewhere in the York Peninsula is a useful indication. Quite often 'forts' or military encampments, which were quite well-known localities at the time of the collection, have now become ruins and are no longer shown on any map. Again, other places are too small to be marked, and occasionally collectors have been misled by names heard in conversation, such as 'Bukit Besar', which is a general term meaning large hill, and does not indicate any precise locality.

## MIS-LABELLING

Curiously enough no cases of mis-labelling have come to light in the Rothschild collection of Nycteribiids. Dr Theodor has, however, found several examples in other material he has examined; in all such cases he has discarded the specimens for the purpose of this catalogue.

## HOSTS

The nomenclature of the bats is based on the following works:

Allen, G. M. (1939). A Checklist of African Mammals. *Bull. Mus. Comp. Zool.* **83**.

Cabrera, A. (1957, 1960). Catalogue de los Mamíferos de América del Sud. *Rev. Mus. Argent. Cienc. Nat.* **4**.

Chasen, F. N. (1940). A Handlist of Malaysian Mammals. *Bull. Raffles Mus. Singapore*, no. 15.

Ellerman, J. R. & Morrison-Scott, T. C. S. (1951). *A Checklist of Palaearctic and Indian Mammals*. Brit. Mus. (Nat. Hist.).

Ellerman, J. R., Morrison-Scott, T. C. S. & Hayman, R. W. (1953). *Southern African Mammals*. Brit. Mus. (Nat. Hist.).

Iredale, T. & Troughton, E. (1934). A Checklist of the Mammals recorded from Australia. *Mem. Austr. Museum, Sydney*, no. VI.

Laurie, E. M. O. & Hill, J. E. (1954). *A Checklist of Land Mammals of New Guinea, Celebes, and Adjacent Islands*. Brit. Mus. (Nat. Hist.).

## INTRODUCTION

- Lawrence, B. (1939). Mammals in 'Collections from the Philippine Islands'. *Bull. Mus. Comp. Zool. Harvard*, 86, 23.
- Sanborn, C. C. (1952). Mammals in 'Philippine Zoological Expedition 1946-1947'. *Fieldiana, Zoology*, 33, no. 2, p. 87.
- Taylor, E. H. (1934). Philippine Land Mammals. *Monog. Philipp. Bur. Sci.* no. 30.

Original labels have naturally not been altered, but the host names in the text have been brought up to date to accord with the authors mentioned above. The original names on the labels are given in the synonymy section of the descriptions of the relevant species.

Unfortunately many of the collectors were unable to identify the hosts and had to be satisfied with indications such as 'Bats. nos. 18-21'; even some of Dr Jordan's specimens bear the laconic label 'from Bat'. Although we have received enormous assistance from Mr R. W. Hayman and Mr J. E. Hill, it has been impossible to trace more than a few of these anonymous hosts with certainty. For example, the bats collected by the Ruwenzori Expedition (1906) are deposited in the British Museum but unfortunately there are no specimens among them collected by Dr A. F. R. Wollaston on February 8th (see below, p. 434). Furthermore, Dr Wollaston's voluminous correspondence was destroyed by order of N. C. Rothschild's executors, and the only other possible source of information has thus been lost to us. Consequently the hosts of the specimens in the collection of *Dipseliopoda biannulata* Oldroyd and *D. setosa* Theodor remain unidentified. No details are available either in the case of the hosts of *Cyclopodia australis* Theodor and *C. albertisii* Rondani which bear the label 'Sep. 17, 1902. Mary River, Northern Territory. J. T. Tunney'. Here the situation is even more tantalizing. The diaries and field notes of that excellent collector were destroyed by his family, and in the portion of Tunney's collection which the Hon. W. Rothschild gave to the British Museum, and in the portion of the collection which remained in the Western Australian Museum at Perth, there are no bats bearing the dates or locality indicated on the Nycteribiid labels. Tunney's letters which have been preserved prove that he was collecting in the Region of the Alligator River, Northern Territory, on 21st October. Furthermore, the Museum's catalogue gives collecting dates for Mary River between 12th September and 20th October. Dr W. D. L. Ride informs us that there are only four bats in the Western Australian Museum collected on this particular trip, two specimens of *Taphozous flaviventris* from the Alligator River locality and two *Nyctophilus geoffroyi pallescens* which have lost their original data and are simply referred to the Northern Territory. It is improbable however that either of these species was the host of *C. australis* as all other known species of *Cyclopodia* s.s. are parasites of Megacheiroptera.

It is disconcerting how quickly time obliterates the traces of large and well-known collections. Thus several hosts bear numbers in the thousands, e.g. 'Bat 4940 and 5044'; nevertheless, it has been impossible to trace them. Even the hosts of type specimens which bear upon their labels such well-known collectors' names as Shaw Meyer and Boden Kloss have not been identified. Once a collector is dead it seems as if everything conspires to ensure that his years of energetic, painstaking and often hazardous work are forgotten. His well-meaning family and friends burn his papers and diaries, specimens are re-labelled and moved from one place to another or merely mislaid. The saga behind the expedition is unknown or meaningless to a



## INTRODUCTION

new generation—in fact the anonymous bats in the Nycteribiid collection give one cause for certain melancholy reflections.

## TYPE MATERIAL

We have used the procedure recommended in the International Code of Zoological Nomenclature adopted by the XVth International Congress of Zoology (1961) for the designation of types, paratypes and neotypes. Where desirable we have designated a female specimen as the holotype, since in this group the females sometimes display better diagnostic characters.

## TERMINOLOGY

We have followed Jobling (1928, 1929) and Tuxen (1956) with regard to terminology, but in all cases open to doubt we have adopted the procedure used in the *Catalogue of Fleas* and employed our terminology in a purely topographical sense. Throughout the catalogue we have used abbreviated descriptions in order to facilitate the rapid determination of material.

## PHOTOGRAPHS AND TEXT FIGURES

Photographs of Nycteribiids do not help the taxonomist to the same extent as they do in the case of fleas. However, it has been thought useful to include photographs of a typical example of each of the two subfamilies and also a photograph of one slide of the genital area and the characteristic abdominal ctenidium. We have been fortunate in persuading Mr Arthur Barron to allot us some of his valuable spare time and have thus been able to produce five plates of his inimitable photography.

Dr M. Costa, Mr N. Gratz, Mrs J. Hoffman, Miss H. Leurer, Dr A. Moscona and Mr J. Schlein have produced the excellent text figures; during the last ten years they worked for various periods under the personal supervision and direction of Dr Theodor.

MIRIAM ROTHSCHILD

May 1962

## ACKNOWLEDGEMENTS

We are particularly grateful to Mr H. Oldroyd of the Department of Entomology of the British Museum (Natural History) for his continuous interest and help in the work on Nycteribiidae throughout the years; to Mr R. W. Hayman and Mr J. E. Hill of the Mammal Department for their assistance in the identification of bats and in questions of nomenclature of host species, and to Dr R. Wenzel, Curator of Insects, Chicago Natural History Museum, who placed his large collection at our disposal, particularly material from the Oriental and Pacific Regions, and donated a number of paratypes and other specimens to the British Museum; to Mr B. Jobling for his advice and help with a variety of morphological questions, and to Mr G. H. E. Hopkins and Dr W. D. L. Ride for searching past correspondence for information relating to collectors and hosts. Our special thanks are due to Mr D. Hollis who checked all the figure captions and descriptions against the drawings and photographs, a task requiring both skill and patience.

We are also greatly indebted to the following colleagues and institutions who kindly placed their material at our disposal for study:

- Dr V. Aellen, Muséum d'Histoire Naturelle, Geneva.
- Dr P. Basilewsky, Musée Royale de l'Afrique Centrale, Tervuren.
- Dr J. Bequaert, Museum of Comparative Zoology, Harvard College.
- Dr M. Beier, Naturhistorisches Museum, Vienna.
- Dr J. W. Evans, Australian Museum, Sydney.
- Dr D. Guiglia, Museo Civico di Storia Naturale, Genoa.
- Dr L. Guimarães, Departamento de Zoologia, Secretaria da Agricultura, São Paulo.
- Dr A. Kapur, Zoological Survey of India, Calcutta.
- Dr R. F. Lawrence, Natal Museum, Pietermaritzburg.
- Prof. E. Lindner, Staatliches Museum fuer Naturkunde, Stuttgart.
- Dr R. Paulian, Institut des Recherches Scientifiques, Madagascar.
- Prof. F. Peus, Zoologisches Museum der Humboldt Universitaet, Berlin.
- Prof. H. Sachtleben, Deutsches Entomologisches Institut, Berlin.
- Prof. E. Séguay, Muséum National d'Histoire Naturelle, Paris.
- Dr Alan Stone, U.S. National Museum, Washington.
- Mr G. B. Thompson, Cambridge.
- Dr F. Zumpt, South African Institute for Medical Research, Johannesburg.
- Zoological Museum, Amsterdam.

We would also like to express our thanks to Mr A. L. E. Barron for the superlative photographs and to the staff of the Cambridge University Press for their unfailing co-operation and brilliant technical assistance.



## EXPLANATION OF ABBREVIATIONS USED IN TEXT AND FIGURES

a. = arista	le. = lens
aed. = aedeagus	l.p. = lateral plates of notopleural sutures
a.f. = anal frame	m.s. = mesopleural suture
a.l. = anal lobe	n.set. = notopleural setae
ant. = antenna	n.sut. = notopleural suture
ant.p. = antennal pit	oc.s. = ocular sclerite
ap. = apodeme	o.s. = oblique suture
a.s. = anal sclerite	o.sen. = olfactory sensillae
a.seg. = anal segment	p. = palp
a.sp. = anterior spiracle	par. = paramere
b.a. = basal arc	ph. = phallobase
b.p. = basal plate	p.p. = posterior process of mesonotum
cl. = clasper	p.s. = post-spiracular sclerite
c.m. = connecting membrane	p.sp. = posterior spiracle
d.l. = dorsal lip	pt. = pretarsus
d.p. = dorsal genital plate	r.m. = retractor muscle of phallobase
d.pro. = dorsal process	s.m.s. = sternal median suture
d.r. = dorsal ridge of phallobase	st. 1+2 = sternite 1+2
e. = endophallus	st. 6. = sternite 6
e.m.p. = erector muscle of phallobase	th. = theca
g. = gena	th.ct. = thoracic ctenidium
g.p. = genital plate	v. = vertex
h.g. = haltere groove	v.p. = ventral genital plate
lc.s. = latero-cervical sclerite	

## MORPHOLOGY

The Nycteribiidae, together with the Hippoboscidae and Streblidae, form the section Pupipara of the Diptera Cyclorrhapha. The Nycteribiidae are all parasitic on bats and their mode of life has resulted in far-reaching adaptations which in some respects have led to developments which are contrary to those in other Diptera. Thus, the sternites of the thorax have become fused to form a broad plate, while the mesonotum is membranous. The pleurae are displaced dorsally and the legs are inserted on the dorsal surface, giving the insects a spider-like appearance (Pls. 1, 2; Figs. 1, 2). The head is folded backwards in the resting position so that its dorsal surface lies on the mesonotum. It is rotated forward by 180° for feeding.

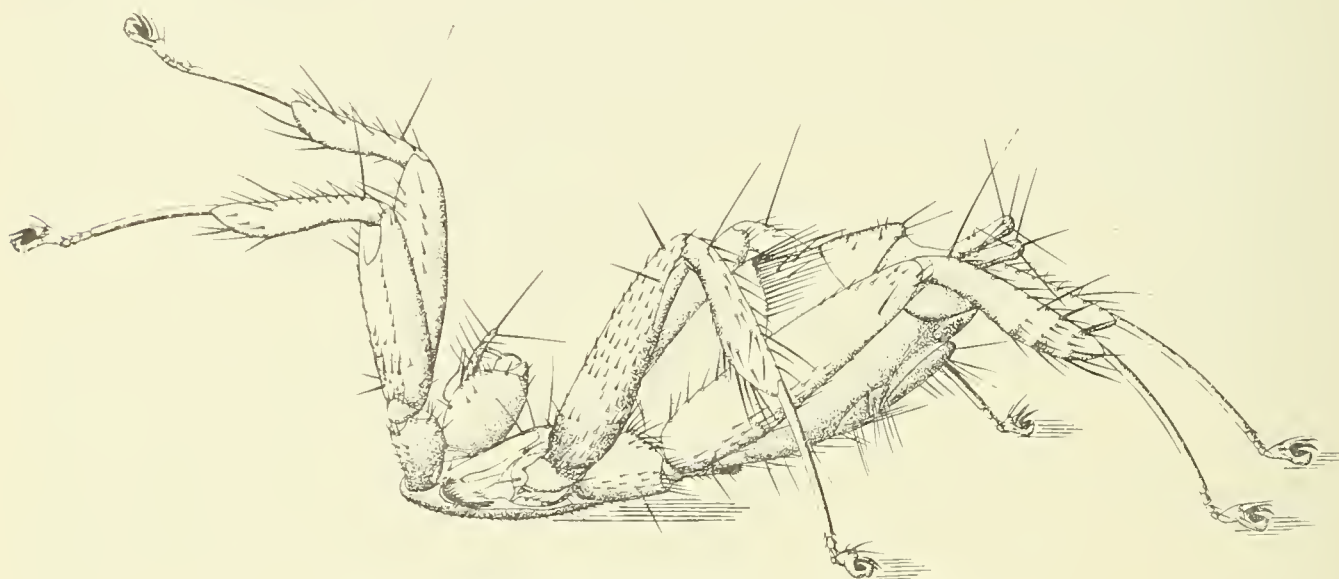


Fig. 1. *Styldia biarticulata* (Hermann). Female, side view.

The head (Pl. 3; Figs. 8–14) is half-spherical or either laterally or dorsoventrally compressed. It is formed by a helmet-shaped sclerite covering the dorsal and lateral surfaces and its anterior and ventral surfaces are membranous. The sclerotization in some cases extends to the anterior dorsal margin and in other cases, when the head is laterally compressed, the anterior median part of the dorsal surface is to a greater or lesser degree membranous. The vertex bears a number of setae, particularly near the anterior margin. Eyes are either present or absent. They consist in most species of either one or two circular lenses, and a single species has eyes consisting of two ocular frames, each with 2 lenses (Fig. 693). The ocular sclerite either lies inside the surface or protrudes from it to a varying extent. It may be pigmented or not. These eyes are reduced compound lateral eyes, as they are innervated from the optic lobe of the protocerebrum.

There is no functional ptilinum and the operculum of the puparium is opened by the action of the fore-legs which lie folded above the head inside the puparium.

The antennae (Figs. 15, 16) apparently consist of two segments, but according to Hennig



## MORPHOLOGY

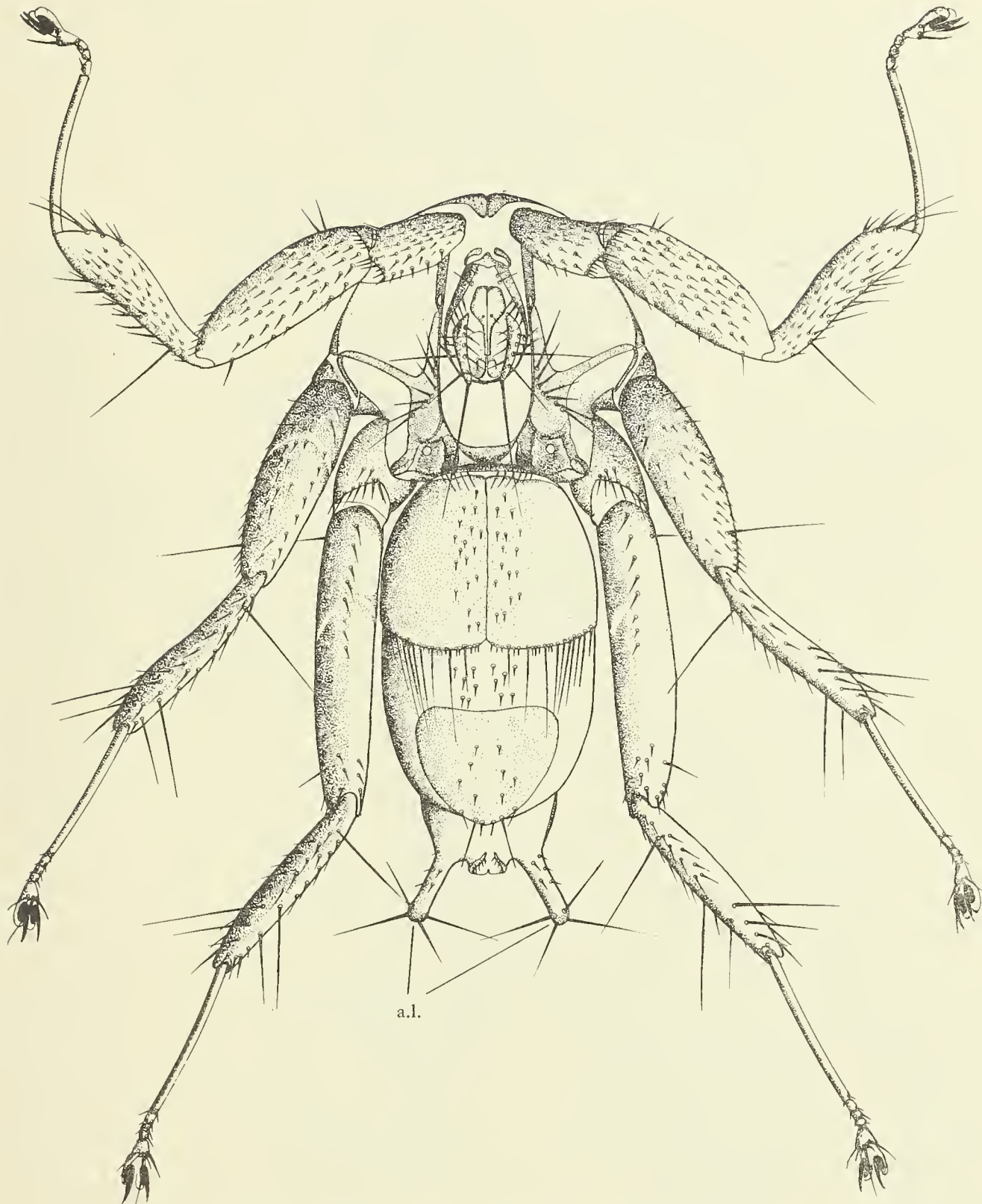


Fig. 2. *Stylidia biarticulata* (Hermann). Female, dorsal view.

# MORPHOLOGY

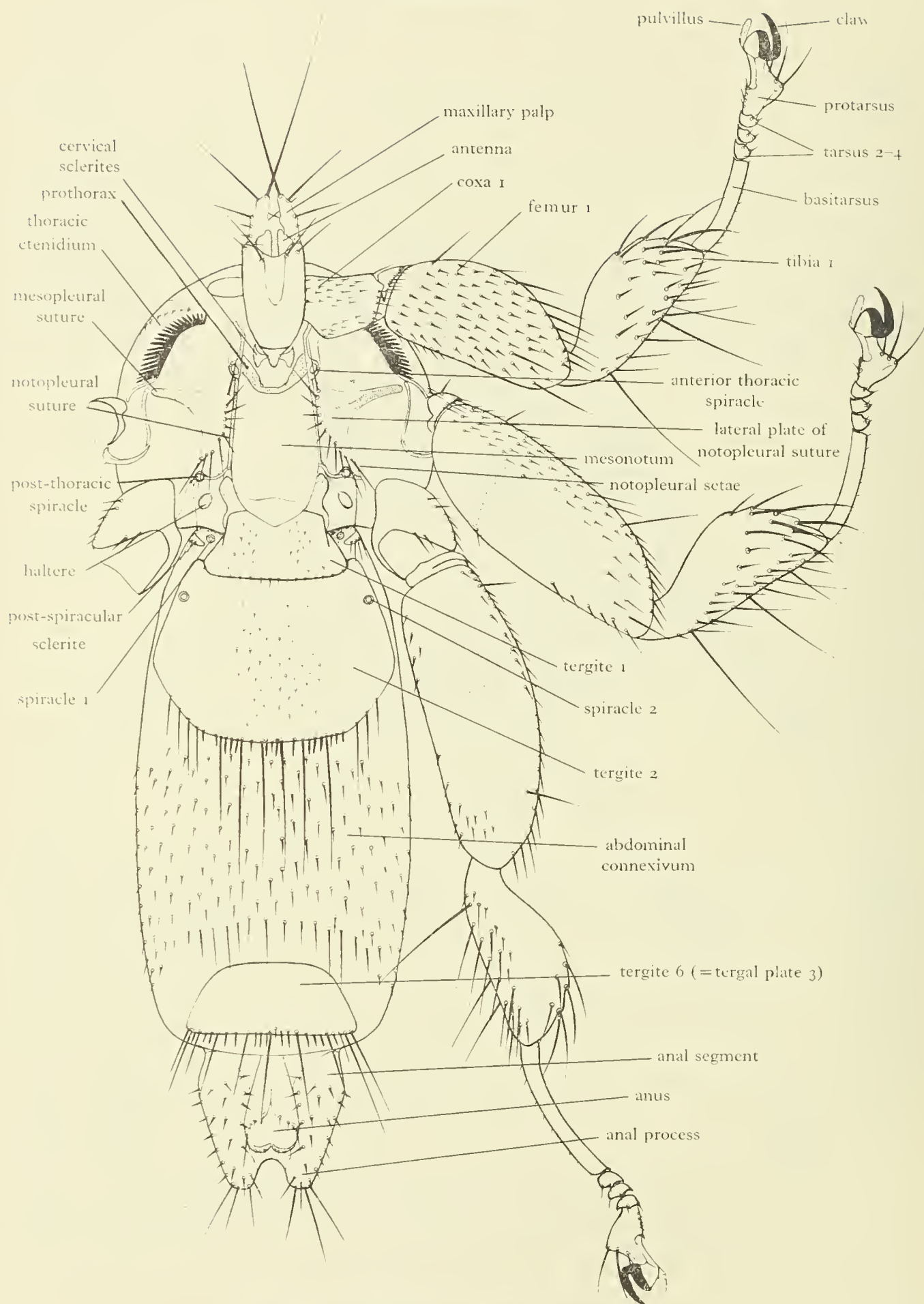
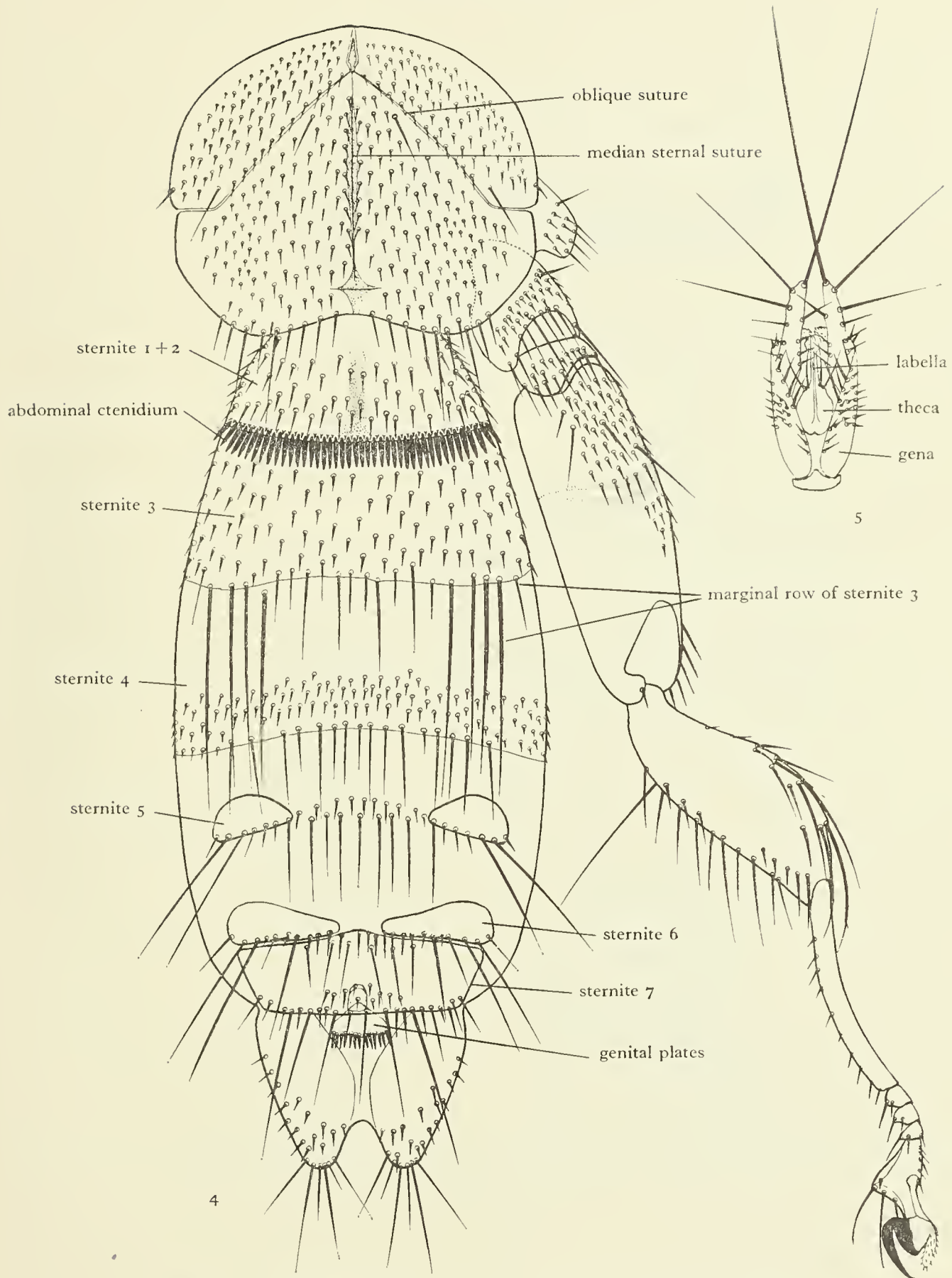


Fig. 3. *Nycteribia latreillii* (Leach). Female, dorsal.

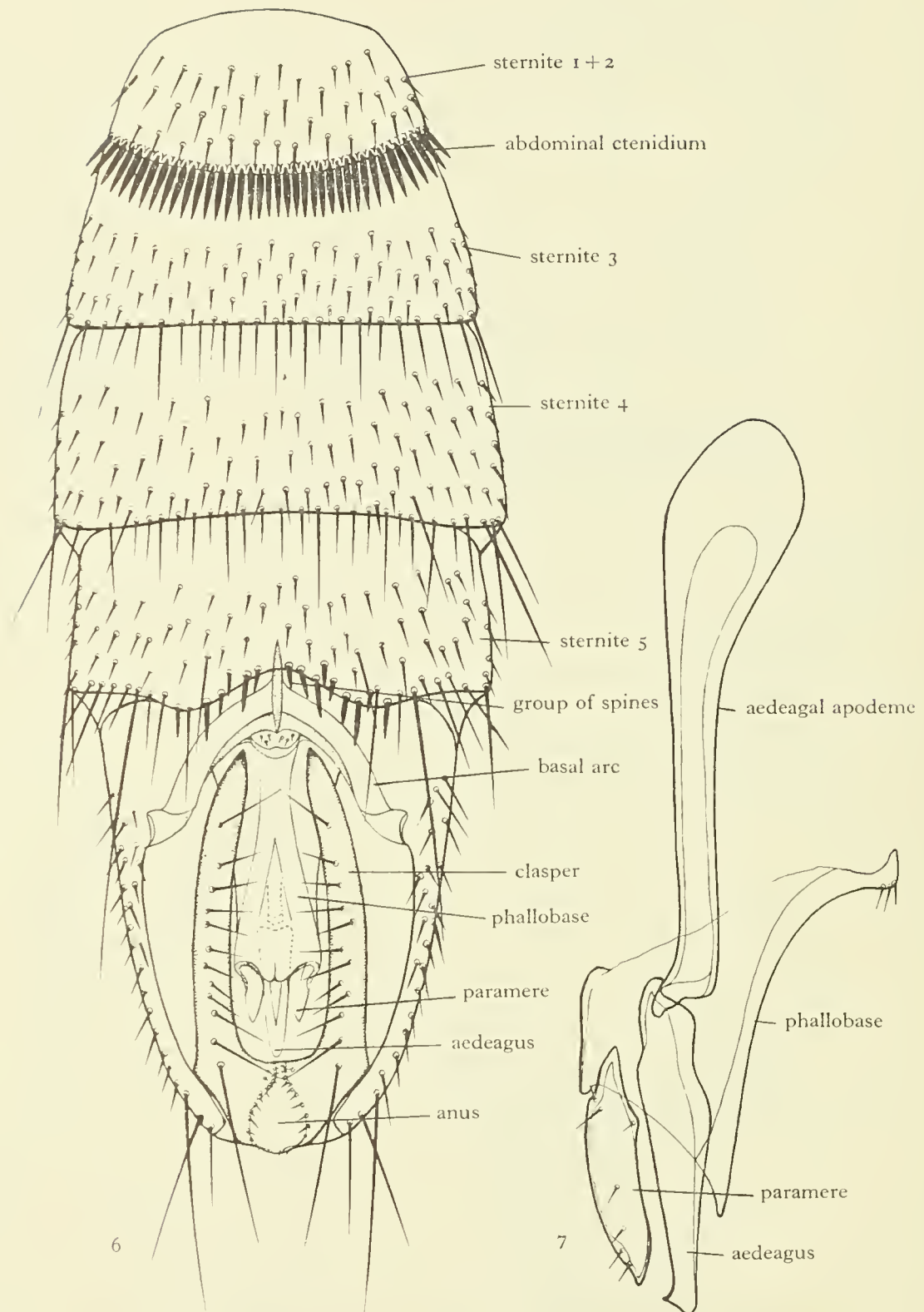


# MORPHOLOGY



Figs. 4, 5. *Nycteribia latreillii* (Leach). 4. Female, ventral; 5. head, ventral.

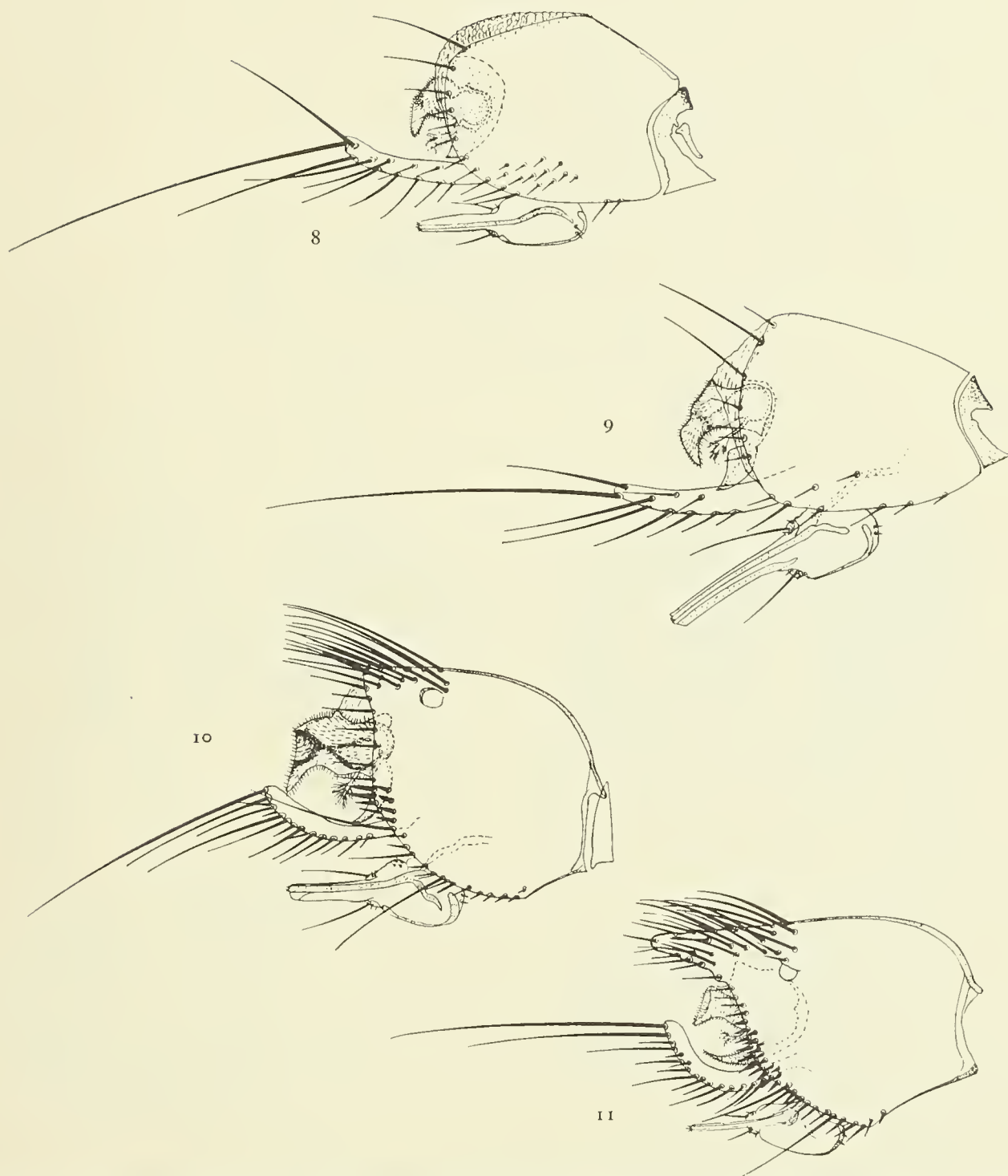
# MORPHOLOGY



Figs. 6, 7. *Nycteribia latreillii* (Leach). Male: 6. abdomen, ventral; 7. genitalia.

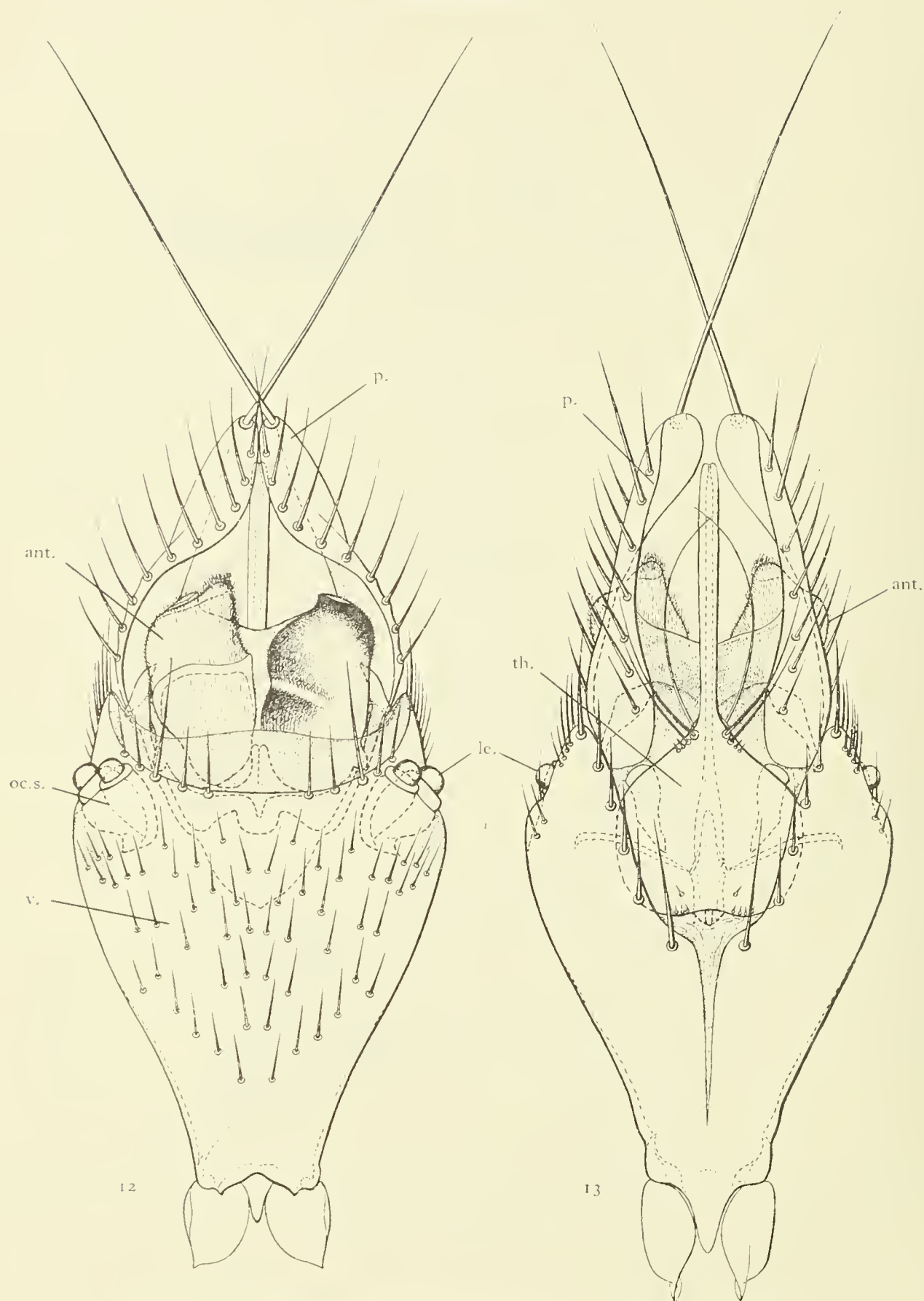


# MORPHOLOGY



Figs. 8-11. Side view of heads of: 8. *Nycteribia latreillii*; 9. *Nycteribia vexata*; 10. *Penicillidia dufourii*; 11. *Penicillidia monoceros*.

# MORPHOLOGY

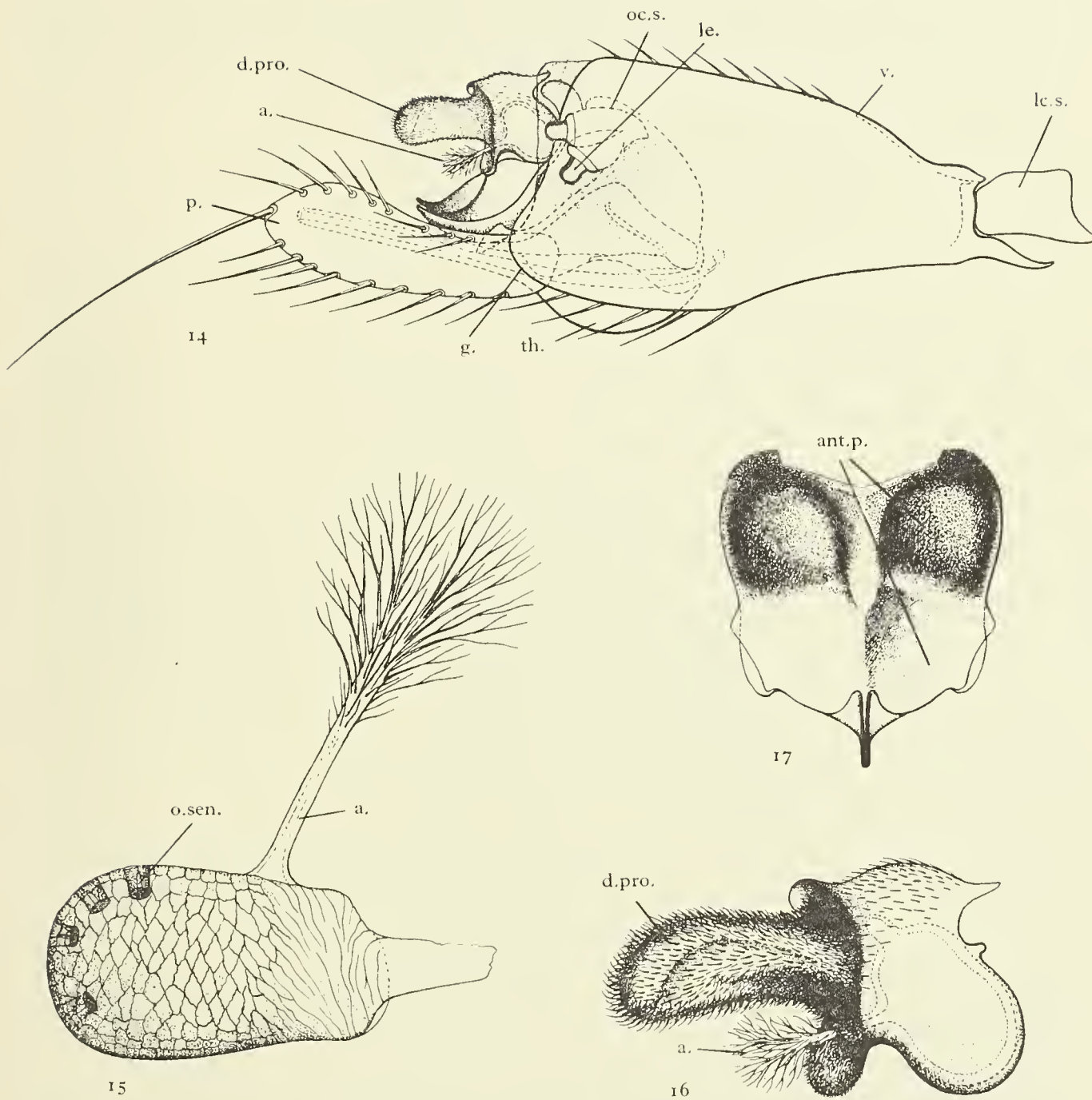


Figs. 12, 13. *Cyclopodia sykesii* (Westwood). Head: 12. dorsal; 13. ventral.\*

\*From Jobling, 1928, *Parasitology* 20, 256, fig. 1.



# MORPHOLOGY



Figs. 14-17. *Cyclopodia sykesii* (Westwood). 14. head, side view; 15. 3rd antennal segment with arista; 16. antenna, side view; 17. frons (all from Jobling, 1928, *Parasitology* 20, 257, 259, figs. 2, 3).

## MORPHOLOGY

(1941) the basal segment consists of the first and second segment, the second being invaginated into the first. According to Jobling (1928) the basal segment of the antenna consists not, as assumed by Hennig, of the combined first and second segment, but only of the second segment (pedicel), the first segment (scape) being fused with the frons. The 3rd segment (apparent 2nd) is invaginated into the basal segment, so that only the dendriform arista remains outside. The basal segment bears a dorsal process which differs in form in the various genera. It bears the dorsal slit characteristic of the second segment of the antenna of calyptrate Diptera.



Figs. 18-21. Palps of: 18 *Nycteribia latreillii*; 19. *Penicillidia dufourii*; 20. *Eucampsipoda hyrtlui*; 21. *Cyclopodia sykesii*.

The maxillary palps (Figs. 18-21) are one-segmented and flattened to a varying degree. They bear setae ventrally and in some genera one or several long terminal setae. Their shape differs in the various genera.

The proboscis of the Nycteribiidae consists of a basal thick part and a narrow anterior part. It differs from the proboscis of the Hippoboscidae in that the labella are very elongated and form the whole narrow anterior part of the proboscis, while the labella of the Hippoboscidae are very short and restricted to the anterior extremity of the proboscis. This has been established by the position of the furca, a small sclerite at the central aspect of the labella, the insertion of the retractor muscle of the labella and the lengthening of the intralabial canaliculi of the sensillae of the labella. The structure of the proboscis and of other parts of the head have been described in detail by Jobling (1928, 1929) in his study of the head of the Nycteribiidae and the Streblidae.

## MORPHOLOGY

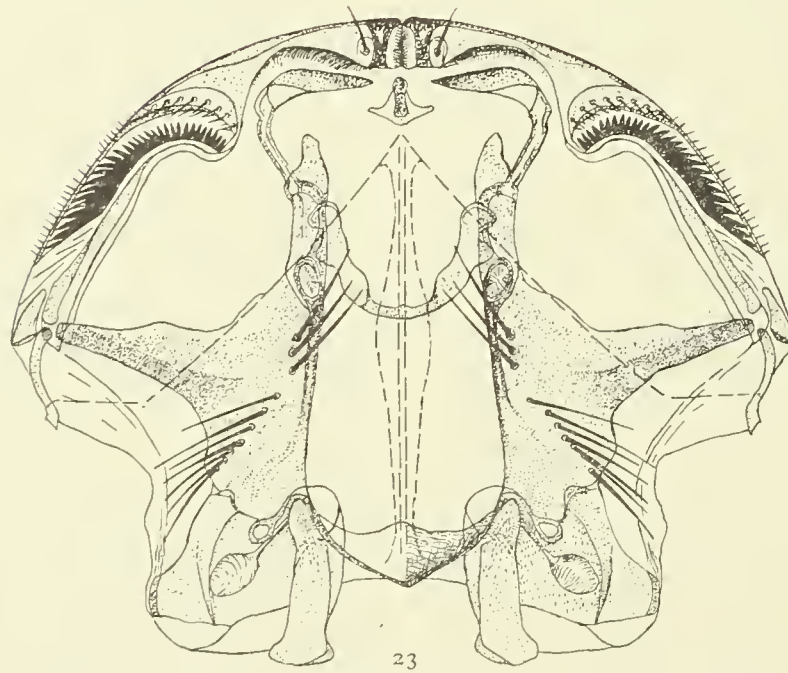
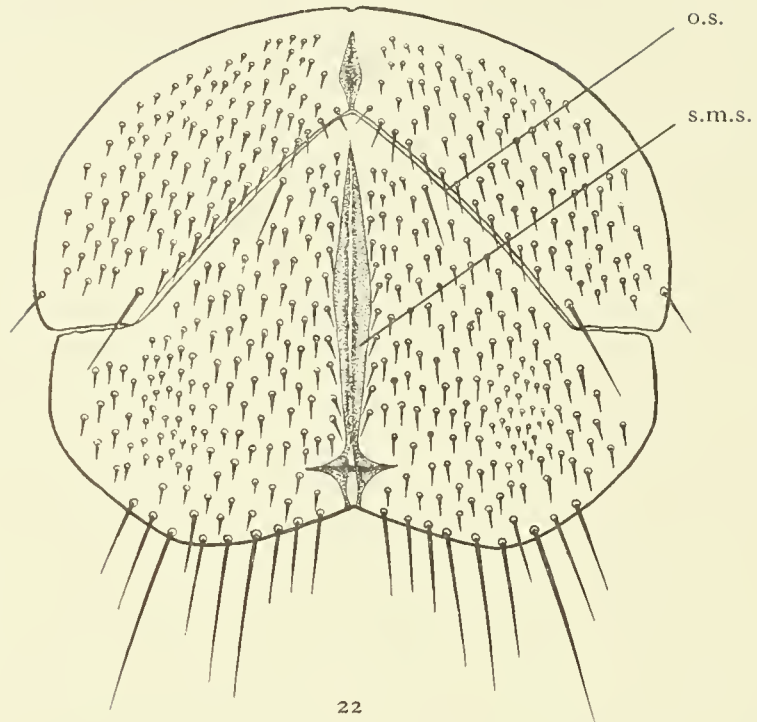
The thorax (Pl. 3; Figs. 22, 23) of the Nycteribiidae has been so greatly modified by the total loss of wings, the development of a new grasping organ, the thoracic ctenidium (Fig. 3), and the displacement of head and legs on to the dorsal surface, that the original limits of the segments have been, to a great extent, obliterated. The homology of the various parts has been interpreted in different ways in the past but our knowledge has been greatly advanced by the detailed study of the thorax by Nussbaum (1960) on which much of the following account is based.

Meso- and metasternite have become fused into a broad plate in all Nycteribiidae (Fig. 22). The prothorax, including the prosternum, has apparently moved to the dorsal surface and lies around the insertion of the head and between it and the fore-coxae. The anterior raised rim of the sternal plate thus belongs to the mesosternum. The sternal plate is divided into an anterior paired part and a posterior single part, both parts separated by a membranous strip, which, judging from the origin of muscles and nerves, does not correspond to a meso-metasternal suture. This membranous strip, called the 'oblique sutures' in the descriptions, forms an angle with the apex in the anterior part of the median line and runs laterally to the posterior aspect of coxa 2 (Fig. 22, o.s.). This is apparently an adaptive development and its function is to give greater sternal flexibility. The oblique sutures are termed 'open' if they are membranous as described above. In some genera, however, they have become secondarily 'fused' or 'closed', so that they are hardly recognizable. The median line of the sternal plate has become strengthened by an internal ridge which is flattened in the middle in some cases and has short vertical apodemes anteriorly and posteriorly. This is termed the sternal median suture (Fig. 22, s.m.s.). In some species with fused oblique sutures the thorax is more or less strongly curved in the longitudinal direction. This apparently has a similar effect to the open oblique sutures which increase flexibility. The anterior margin of the sternal plate is raised so that it acts like the anterior curved part of a sledge when the insect moves through the fur of its host.

The dorsal surface of the thorax (Figs. 3, 23) is membranous in its greater part, divided by sclerotized ridges and plates. Two longitudinal ridges enclose a median field. They are considered as the notopleural sutures (Pl. 3; Figs. 3, 23) and the field between them as the mesonotum with the prothorax situated anteriorly. The anterior spiracles (Fig. 3) lie inside the notopleural sutures more or less close to their anterior end. The posterior spiracles lie on a branch of the notopleural sutures anterior to the haltere groove. The posterior limit of the mesonotum is formed by a vertically placed plate which in some genera is raised like the bow of a ship and in some species bears a median triangular or finger-shaped process. The area which is situated laterally to the notopleural suture represents the pleurae. Sclerotized plates, which bear a row of characteristic setae, the notopleural setae (Figs. 3, 23), are situated laterally, adjoining the notopleural sutures. The lateral plates vary in size and extent in different genera, being sometimes narrow and only present posteriorly. The mesopleural suture (Figs. 3, 23) is a more strongly sclerotized ridge which runs from the anterior part of the lateral plates to the anterior aspect of coxa 2. The pattern formed by the notopleural sutures, their lateral plates and the mesopleural sutures differs in the various genera. A ridge in which the posterior spiracle lies, and which forms the anterior margin of the haltere groove, branches from the posterior part of the notopleural sutures. The halteres are of uniform shape throughout the family, with a



# MORPHOLOGY



Figs. 22, 23. *Nycteribia latreillii*. Thorax. 22. ventral; 23. dorsal.

# MORPHOLOGY



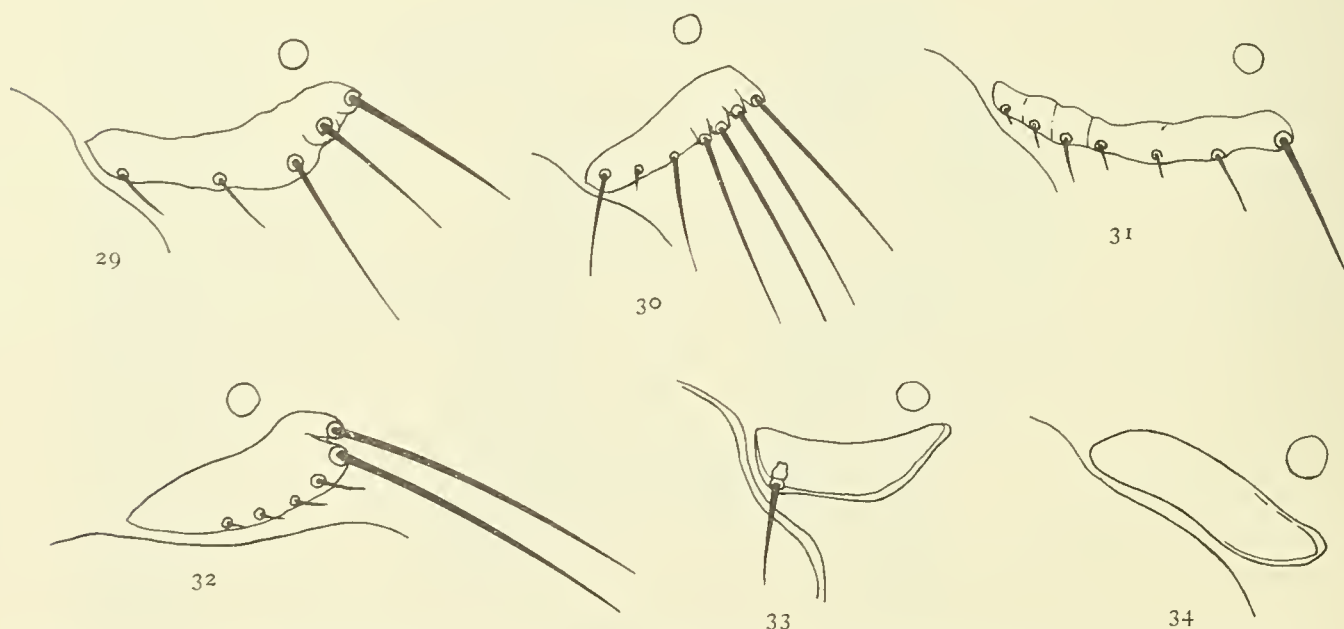
Figs. 24-28. Fore legs of: 24. *Stylidia biarticulata*; 25. *Nycteribia latreillii*; fore tibiae of: 26. *Penicillidia dufourii*; 27. *Eucampsipoda hyrtlü*; 28. *Cyclopodia greeffi*.

## MORPHOLOGY

slender stalk and round or oval head. The haltere groove (Figs. 3, 23) may be open or closed by a sclerotized flap, the haltere groove cover, which in the past has been erroneously considered as the haltere itself. The cover originates at the median side of the groove. It may be complete as in the genus *Penicillidia* and some species of the subgenus *Cyclopodia* s.str. or may only partly cover the groove as in other species of the subgenus *Cyclopodia* s.str. and in the new genus *Stereomyia*.

At the anterior lateral parts of the thorax, between coxa 1 and 2, above the sternal plate, lies a movable sclerite which bears a row of strong, curved spines, the thoracic ctenidium (Figs. 3, 23). This sclerite articulates with parts of coxa 2 and has to be considered as a differentiation of the coxa which has assumed a new function. The ctenidium can be everted by the action of muscles which originate on the sternal plate posteriorly to the oblique sutures (promotor coxae, no. 19 after Nussbaum) and returns to its resting position inside its groove owing to the elasticity of the sclerites connected with it. Its function is obviously grasping the fur of the bat and steadying the insect. The thoracic ctenidia are clearly an adaptation to ectoparasitic life (Rothschild, 1917) and are peculiar to the family Nycteribiidae, where they are present in all except in the subgenus *Eremoctenia* of the genus *Penicillidia*.

*Legs* (Figs. 24-28). The coxae of the fore legs are cone-shaped and lengthened in some genera, flattened in others. Coxae 2 and 3 are shorter and ring-shaped. The femora are well developed and have a ring of weaker integument near their base. The tibiae are either strongly compressed laterally and bear a characteristic complement of setae at their ventral edge, generally consisting of 3-4 rows of long setae, or they are less flattened and have 2-3 rings of weaker integument in the middle with shorter setae at the proximal margin of the rings. In these rings of weaker integument the exocuticle is very thin, the endocuticle thicker and their function is obviously to increase the flexibility of the tibia, acting as a sort of secondary joint. The basitarsus may be



Figs. 29-34. Post-spiracular sclerites of: 29. *Nycteribia latreillii*; 30. *Stylidia biarticulata*; 31. *Basilina nattereri*; 32. *Basilina daganiae*; 33. *Eucampsipoda hyrtl*; 34. *Cyclopodia greeffi*.

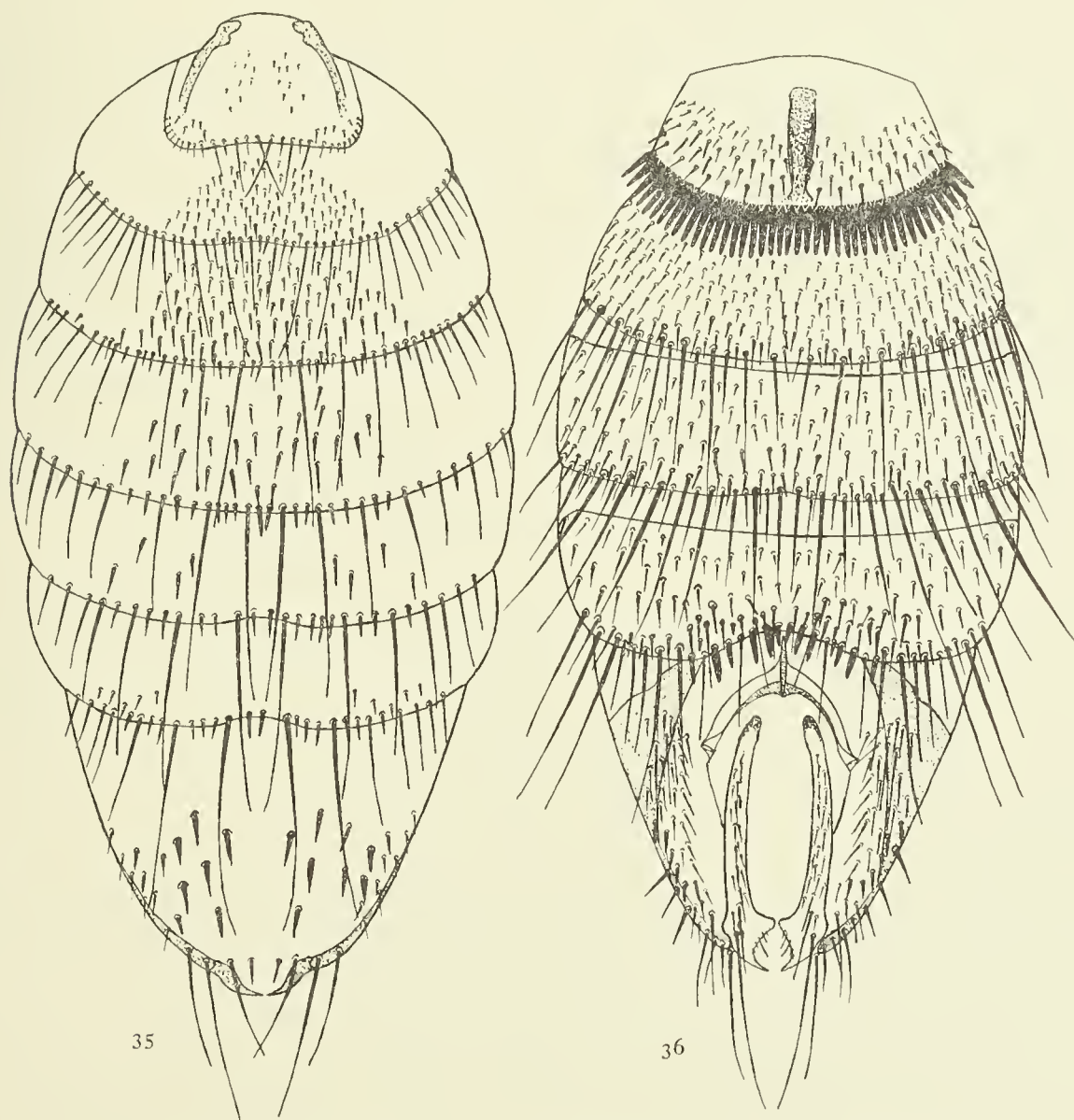


## MORPHOLOGY

very long or short and also has a number of half-rings of weaker integument. Tarsal segments 2-4 are short, about as long as wide. The pretarsus is longer and bears 2 strongly curved claws, the shape of which is characteristic for the Pupipara, and 2 pulvilli, but no empodium. In life, the femora are directed obliquely upwards, forming an acute angle with tibiae and tarsi.

Wings are absent in all Nycteribiidae and the nearly complete disappearance of the indirect wing musculature (except for one small muscle, no. 38, according to Nussbaum) and the extensive membranization of the dorsal surface of the thorax suggest that they have been lost early in the development of the family.

The abdomen of the Nycteribiidae is formed by 7 segments in addition to the anal segment and 7 pairs of spiracles are present in all species. The original position of the spiracles has changed in many cases, either by concentration in the posterior part of the abdomen through growth of



Figs. 35, 36. *Nycteribia latreillii*. Male abdomen. 35. dorsal; 36. ventral.

## MORPHOLOGY

the anterior sclerites (*Paracyclopodia*) or by displacement into other segments, so that sometimes a segment contains 2 spiracles and the next segment none. The original number of tergites or sternites is reduced by fusion of the sclerites in some cases or by their disappearance in others.

Near the first abdominal spiracle lies a small strip-like or elliptical sclerite, the post-spiracular sclerite (Figs. 29-34). In most genera, this sclerite bears setae or spines at its posterior margin, a single seta in others and none in the subgenus *Cyclopodia* s.str.; it is absent in the genus *Penicillidia*. The homologies of this sclerite have not been worked out, but it may represent a remnant of sternite 1. If this supposition should prove correct, the interpretation of the basal sternite as sternite 1+2 would have to be re-considered and the basal sternite would then be regarded as sternite 2.

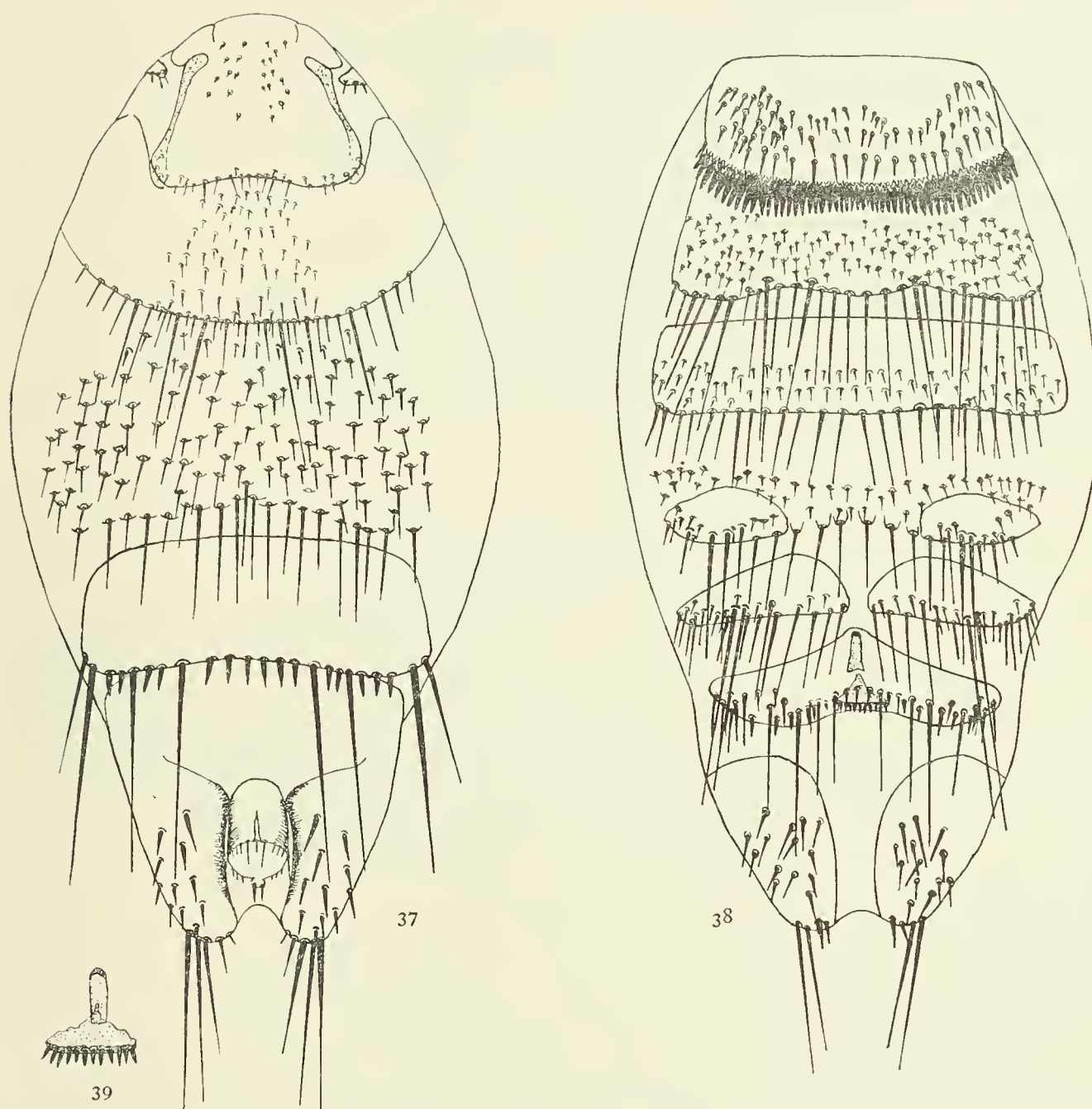
The abdomen of the male (Figs. 6, 35, 36) has preserved its original segmentation to a higher degree than that of the female. There are 6 tergites in the male abdomen in addition to the anal segment in all genera, but tergites 1 and 2 have become fused in the subfamily Cyclopodiinae, both in male and female. In the subfamily Nycteribiinae fusion of tergites 1 and 2 has occurred only in a few species, in the males of some species of *Penicillidia* and in both sexes of *HersHKovitzia*. On the venter, sternites 1 and 2 have become fused in all Nycteribiidae in both sexes and this sclerite bears the abdominal ctenidium in all genera except *Archinycteribia*, *Stereomyia*, the subgenus *Eremoctenia* of *Penicillidia* and a few species in other genera. (For example in the female of a species of *Penicillidia*, where the tendency to reduction of the ctenidium is very marked in several species.)

Three further sternites are recognizable in all male Nycteribiidae. Sternite 5 bears a characteristic armature of spines in most species. The posterior sternites have been incorporated in the complex of the external genitalia. A more or less arc-shaped or triangular structure, the basal arc (Fig. 40), forms a frame around the anterior part of the genital area and the muscles moving the phallobase originate on it. This basal arc (Hypandrium, van Emden and Hennig in Tuxen, 1956, Gabelplatte in German) has been interpreted as sternite 9.

Far reaching changes in the segmentation have taken place in the female abdomen (Figs. 3-4, 37, 38), mainly because a greater or smaller part of the integument has become membranous in order to allow for expansion of the abdomen. Seven pairs of spiracles are, however, preserved in all species. Only in a single genus, *HersHKovitzia*, are there 7 tergites and sternites, tergites 1 and 2 being fused. This is the most primitive condition existing. In other genera, 2, 3, or 4 sclerotized plates are present anterior to the anal segment. It is not always possible to decide whether such a plate corresponds to a certain body segment or whether it has been formed by fusion of two or more tergites or sternites. In such cases the term 'tergal plate' has been used and its number corresponds to the actual number of sclerites present or visible. 'Tergal plate' is thus a purely descriptive term, and does not indicate a particular segment of the body. In some genera reduction of abdominal tergites and sternites has gone so far that nearly the whole abdomen is membranous. Thus in the subgenus *Cyclopodia* s.str. there are no tergites between the basal tergal plate, consisting in this case of tergites 1 and 2, and the anal segment. In other genera of the Cyclopodiinae a tergite in front of the anal segment has been preserved. This apparently corresponds to segment 6, as spiracle 6 lies inside it in some species of *Eucampsipoda*. On the venter, sternite 1 + 2 is always present, bearing the abdominal



## MORPHOLOGY



Figs. 37-39. *Nycteribia pedicularia* Latreille. Female abdomen. 37. dorsal; 38. ventral; 39. genital plates.

ctenidium, except in the genera mentioned above. Sternites 3 and 4 are membranous in most genera, their posterior margins indicated by rows of setae or bare spaces. Sternites 5 and 6 bear sclerotized plates which are divided in the middle in most species of the Nycteribiidae. Only in a few species are sclerotized plates present on sternites 3 and 4. Sternite 7 is also sclerotized and rarely divided. In some cases it has taken over the function of a genital plate covering the genital opening from below. In a few cases special developments have taken place. Thus in *Paracyclopodia* the basal tergite and sternite have increased in size to such an extent that all other segments have been compressed in the posterior half or third of the abdomen, as



## MORPHOLOGY

indicated by the position of the spiracles. In other cases (*Stereomyia*) sclerotization of the greater part of the abdomen may have been caused by fusion of sclerites.

*Genitalia.* The genitalia of the Nycteribiidae have been described in detail in previous publications (Theodor, 1953, 1959, Theodor & Moscona, 1954). In their primitive form they are very close to the hypothetical basic structure of the genitalia of pterygote insects as described by Snodgrass (1935). The terminology used here is that of Snodgrass (1935) and agrees with that given by van Emden and Hennig (in Tuxen, 1956).

The only structures of doubtful homology are the claspers. These are considered by some authors as homologous with the gonopods of the Nematocera. According to Crampton (1942) and Snodgrass (1957), however, these have become completely obsolete in the Cyclorrhapha and the claspers of the Cyclorrhapha may be considered as outgrowths of tergum IX which have become articulated. The term 'claspers' is used here in a purely descriptive sense without expressing any opinion about their homologies.

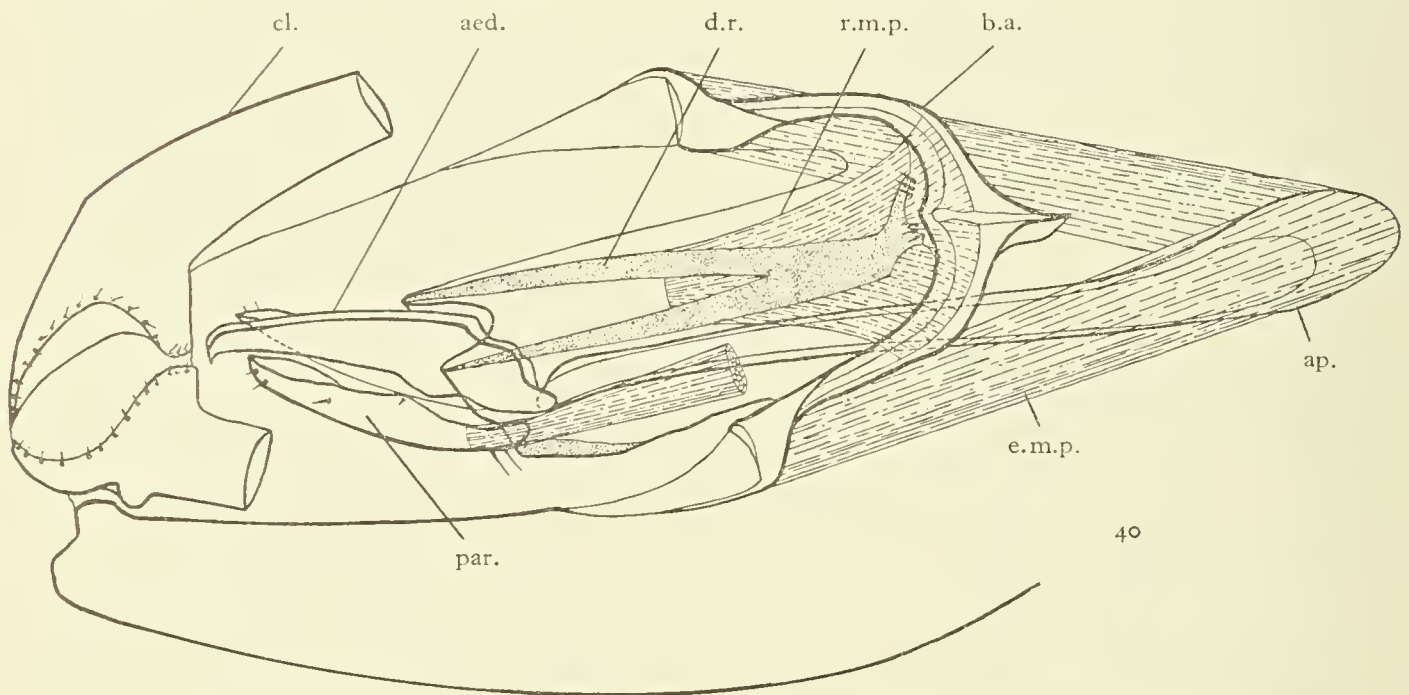


Fig. 40. *Nycteribia latreillii*. Male genitalia, semi-diagrammatic, half profile, showing muscle attachments.

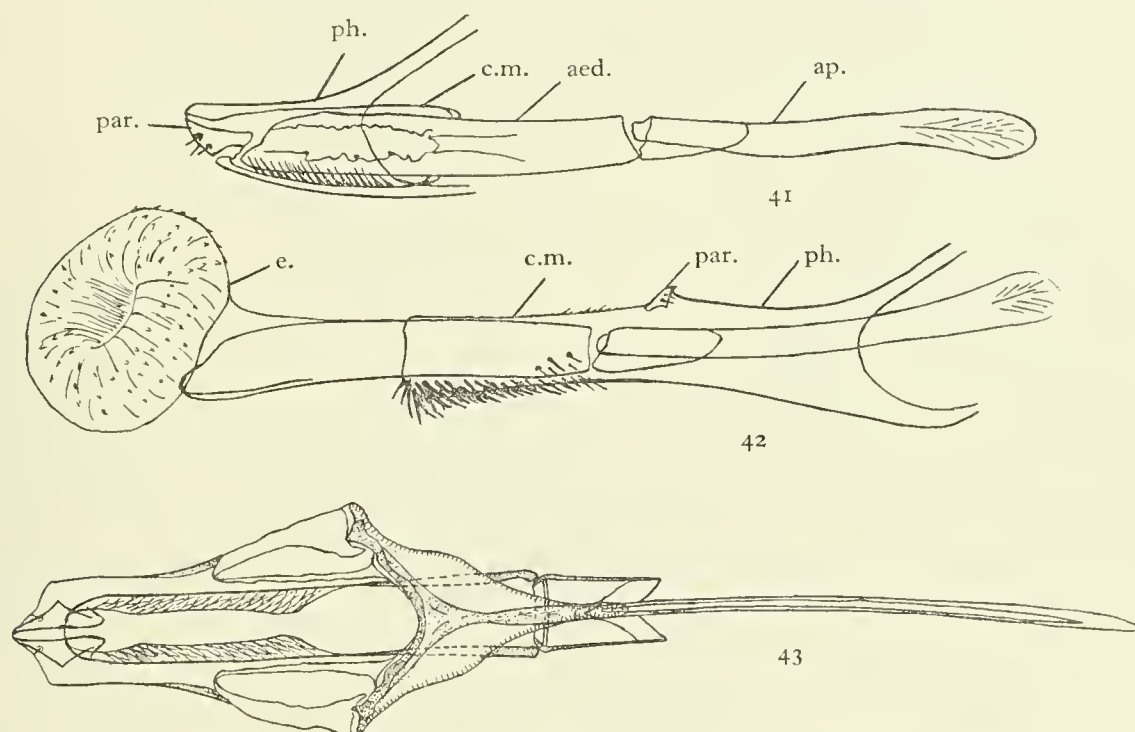
There are three types of male genitalia in the Nycteribiidae:

1. The *Nycteribia* type (Figs. 7, 40). This is the most primitive type from which apparently the other types have developed. The aedeagus consists of two lateral plates which are fused ventrally. It is covered by a dorsal membrane in which the ductus ejaculatorius opens. The aedeagus articulates with a long, laterally flattened apodeme on which are inserted muscles originating on the basal arc. The aedeagus lies free inside a conical phallobase from which it can be protruded for a short distance. The phallobase bears two parameres distally which in the resting position form a sheath around the aedeagus. The parameres can be turned sideways and backwards around their basal articulation in some genera; in others they are fused with the

## MORPHOLOGY

phallobase. This type of genitalia is present in all genera of the subfamily Nycteribiinae and in some genera of the Cyclopodiinae where it may possess endophallic structures.

2. The *Eucampsipoda* type (Figs. 41-43). This is a modification of the Nycteribia type. The aedeagus is connected with the phallobase by a tubular connecting membrane which bears spines which are directed backwards when this is everted. The membrane permits the protrusion of the aedeagus from the phallobase by approximately its own length. The dorsal membrane of the aedeagus has developed into an endophallus of varying form which in the

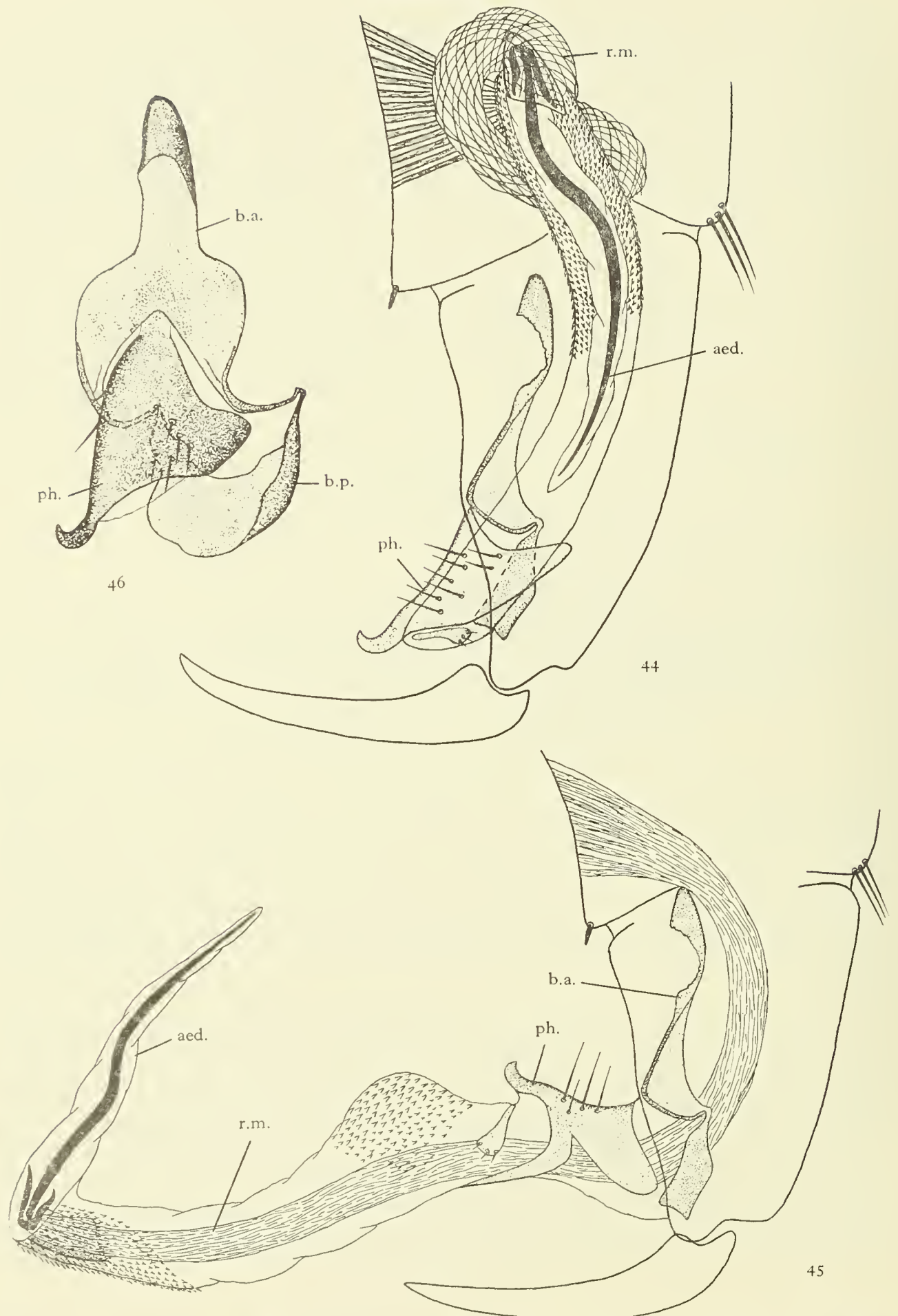


Figs. 41-43. *Eucampsipoda hyrtlui*. Male genitalia. 41. resting position; 42. extended position; 43. ventral view.

resting position is invaginated inside the aedeagus. The parameres are reduced to small triangular sclerites. This type of genitalia is present in the genus *Eucampsipoda* and in two species of the genus *Dipseliopoda*. In the third species of this genus the genitalia are strongly modified. The aedeagus is very long, slender and pointed. There is no endophallus; the phallobase is markedly conical with a narrow opening and the connecting membrane is without spines. The apodeme of the basal arc is very long and the whole arrangement resembles that found in some Streblidae.

3. The *Cyclopodia* type (Figs. 44-46). The aedeagus has become wholly membranous and its wall is strengthened by a rod-like sclerite. The aedeagal apodeme has disappeared and a long, strip-like retractor muscle which originates on sternite 5 is inserted at the base of the aedeagus. There is a long membranous tube connecting the aedeagus with the phallobase. This tube bears several groups of long and short spines. The phallobase is triangular with an apical hook. The parameres are reduced to small triangular or elliptical sclerites. The aedeagus can be retracted completely inside the abdomen. This type is present in the subgenus *Cyclopodia* s.str., while the subgenus *Leptocyclopodia* has genitalia of the *Nycteribia* type, with more or less developed endophallic structures.

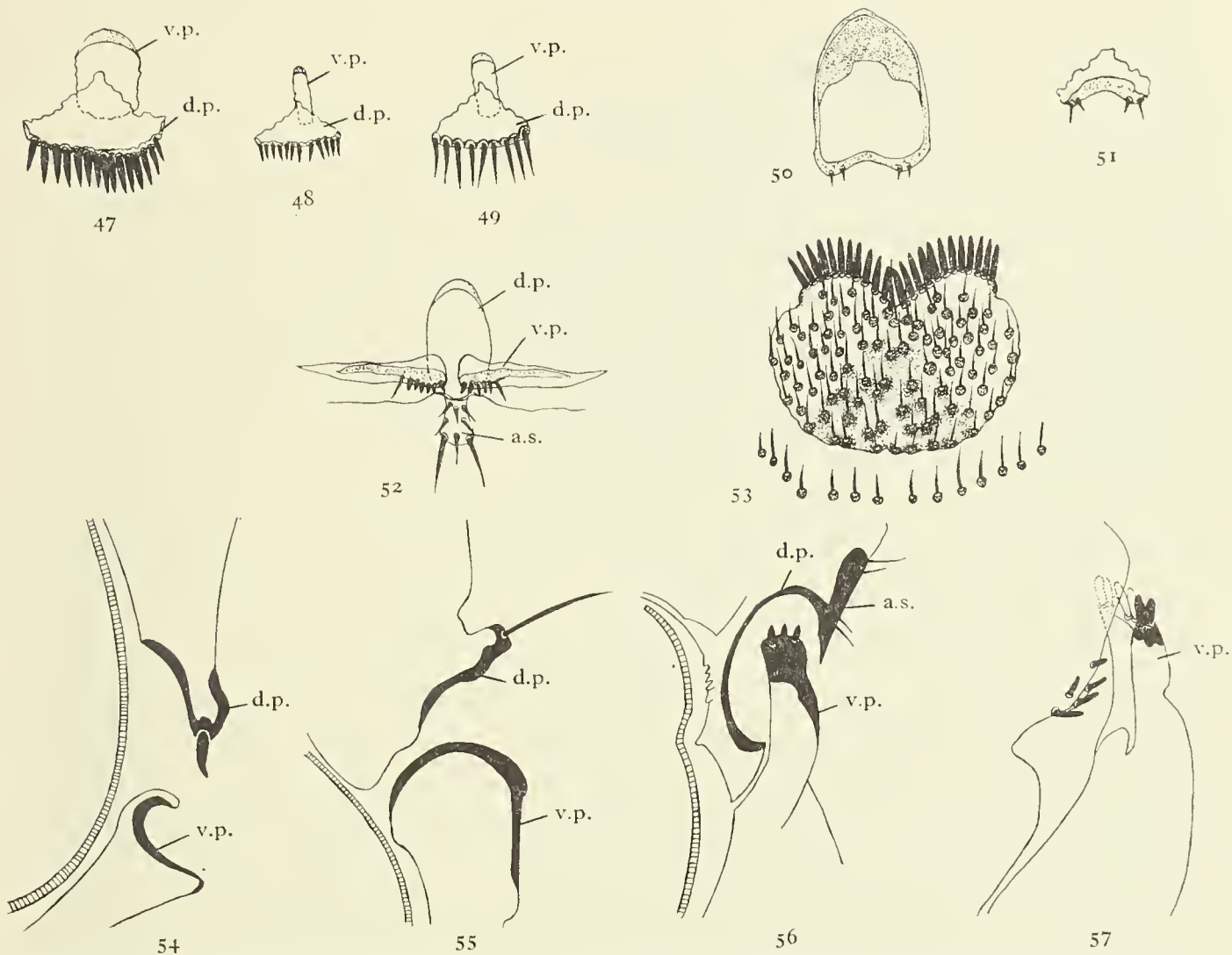
# MORPHOLOGY



Figs. 44-46. *Cyclopodia greeffi*. Male genitalia. 44. retracted; 45. extended; 46. basal arc and phallobase.



## MORPHOLOGY



Figs. 47-57. Genital plates of females of: 47. *Nycteribia latreillii*; 48. *N. pedicularia*; 49. *N. kolenatii*; 50. *Stylidia biarticulata*; 51. *N. vexata*; 52. *Eucampsipoda hyrtlai*; 53. *Cyclopodia greeffi*. Median sagittal sections through the genital area of females of: 54. *N. latreillii*; 55. *Penicillidia dufourii*; 56. *Eucampsipoda hyrtlai*; 57. *Cyclopodia sykesii*.

There is a hypopygium circumversum in the Nycteribiidae as in all Cyclorrhapha, i.e. the vas deferens ascends at the left side of the intestine, traverses it dorsally and descends at its right side before entering the aedeagus.

In the female, there are one or two genital plates in the Nycteribiinae, a dorsal plate with or without spines or setae and a ventral plate lacking spines. In some genera, the dorsal plate is reduced to a group of setae. In the Cyclopodiinae, there is a dorsal plate only in the genus *Eucampsipoda* and in one species of *Dipseliopoda* in a reduced form. Sternite 7 has assumed the function of a genital plate in most species of the subfamily, covering the genital opening from the ventral side. A similar arrangement is found in a few species of Nycteribiinae. The genital plate of the Cyclopodiinae, that is sternite 7, bears spines and setae in a characteristic arrangement in some groups, particularly in the subgenus *Cyclopodia* s.str. and in *Eucampsipoda* (Figs. 47-57).

## CHAETOTAXY

The chaetotaxy of the Nycteribiidae is adapted to their ectoparasitic life in fur. Most sclerites bear rows of setae at their posterior margin which cover the space between them and the following sclerites. Such a 'marginal row' is also present at the posterior margin of the sternal plate of the thorax, covering the space between thorax and abdomen. There are setae on the surface of the sclerites, some lying horizontally and directed posteriorly, similar to those of the marginal rows and others in a vertical position, at right angles to the surface, which probably have a sensory function. In addition, there are spines in various places. In the *Catalogue of the Rothschild Collection of Fleas* (Glossary, p. 33, vol. 1), the authors have reserved the term 'spine' for non-articulated cuticular outgrowths, not arising from an alveolus. In the Nycteribiidae all hair-like or spine-like outgrowths are true setae—there are no outgrowths of the cuticula which are homologous with the spines of the Siphonaptera. The term 'spine' is, therefore, used in a purely descriptive sense, to indicate setae which are short, thick and straight, rather than long, curved, flexible and hair-like. There are consequently transitional forms between the two. The spines of the thoracic ctenidium are curved near the base and have internal secondary striations and the spines of the abdominal ctenidium are straight and have similar striations. There is a third group of spines of importance at the posterior margin of sternite 5 of the male. It is present in nearly all genera and takes the form of a ctenidium in some genera of the Cyclopodiinae. In some cases the spines forming this group are very short, thick and barrel-shaped.

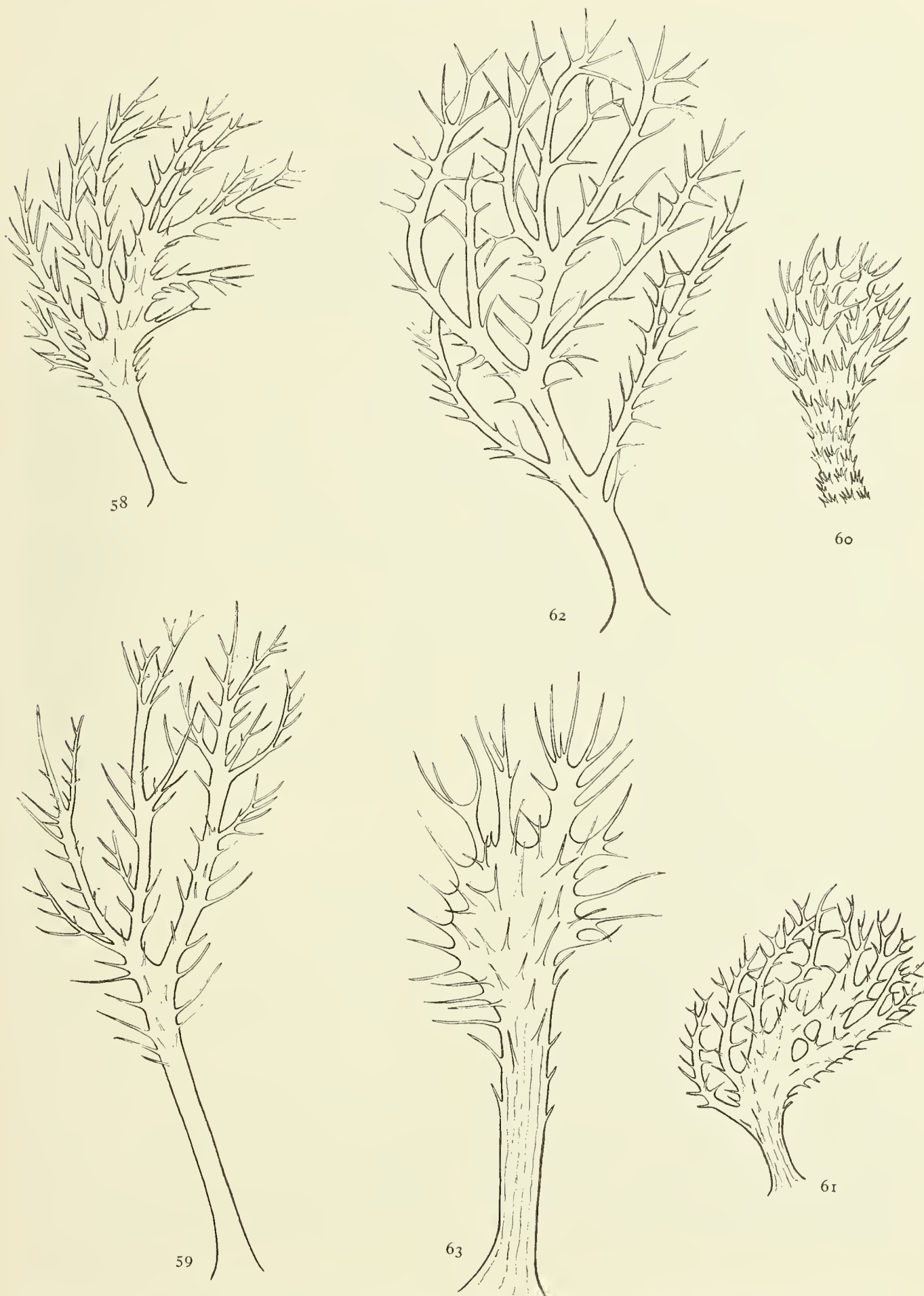
The number and length of spines and setae and their position varies considerably, so that in some cases individuals of closely related species are difficult to distinguish and a series has to be examined in order to establish an average. Thus, for instance, the number of spines on sternite 5 of the male of *Nycteribia pedicularia* varies from 7 to 14, the average of 50 specimens being 10. In *Nycteribia kolenatii*, the number varies from 5 to 10, the average of 20 specimens being 7.3. The position of the setae also varies considerably and displaced spines or setae are frequent. In addition, abnormal division of sclerites is not rare and such specimens have been described as new species (*Nycteribia biscutata*).

The use of chaetotactic characters is thus not as sure and decisive as in other groups of Diptera and this agrees with the very great plasticity of the family as a whole which has led to so many extreme and bizarre developments. This plasticity is so great that specific characters in the Nycteribiidae are often equivalent in their degree of difference to that of genera in other groups of Diptera.

The most important groups of setae and spines are briefly mentioned below.

*Head.* The number and arrangement of the setae at the anterior dorsal margin of the head and on the vertex, between the eyes (*Basilina*, *Penicillidia*). The rows at the anterior ventral margin may be distinctive. The palps have an arrangement of setae characteristic for the genus (Figs. 18–21). The arista of the antenna is dendriform and of very uniform shape throughout the family, except in *Herskovitsia*, where it is club-shaped, with rudimentary branching. The type

# CHAETOTAXY



Figs. 58-63. Aristae of antennae of: 58. *N. latreillii*; 59. *Penicillidia fulvida*; 60. *Herskovitzia coeca*; 61. *Archinycteribia octophthalma*; 62. *Dipseliopoda biannulata*; 63. *Cyclopodia horsfieldi*.



#### CHAETOTAXY

of branching, the number and thickness of the branches varies in some genera and there may be different aristae in species of the same genus (Figs. 58–63).

*Thorax.* The row of notopleural setae crosses the lateral plates of the notopleural sutures diagonally in the Nycteribiinae and in most cases consists of 6–16 setae. In the Cyclopodiinae they are reduced to 1–3 in most species. These setae are absent in some species of *Penicillidia* and in a few species in other genera. They may also be reduced in one sex only. The row of setae at the posterior margin of the sternal plate is well developed in most genera, consisting of long and short setae. It is markedly reduced in *Stylidia*, where it generally consists of 3–5 setae at each side, but is reduced to a single seta at each side in the species of the *scissa* group. The setae at the ventral edge of the tibiae are well developed in the Nycteribiinae. They are usually arranged in 3–4 rows. They are reduced in the Cyclopodiinae.

*Male abdomen.* The marginal rows of the anterior tergites consist of shorter setae, whereas the marginal rows of the posterior tergites generally contain some longer or very long setae. These setae are particularly numerous in the genus *Penicillidia* where they form a thick brush. The number, presence or absence of setae on the post-spiracular sclerite is of importance. The most important group is that on the posterior margin of sternite 5, which is present in nearly all species and shows characters of generic and specific rank, although it is variable as pointed out above.

*Female abdomen.* Nearly all setae are of taxonomic value, but the long setae on the dorsum of the subgenus *Cyclopodia* s.str. and the arrangement of the setae on the genital plates (or on sternite 7 where this serves as genital plate) are particularly important.

## GLOSSARY

### **abdominal ctenidium** (Figs. 4, 6)

A row of closely placed, flattened spines at the posterior margin of sternite 1 + 2. In the genus *Penicillidia* the spines are more widely spaced, less specialized in form and their number is reduced, particularly in the female. In the genus *Archinycteribia*, the genus *Stereomyia* and the subgenus *Eremoctenia* of *Penicillidia* the abdominal ctenidium is absent. It is also absent in the female of *Penicillidia actedona* n.sp., while there are some spines present in the male.

### **adanal plates** (Figs. 431-442, 517)

Two small sclerites isolated from the ring-shaped anal frame, lateral to the anal sclerite. They are particularly well developed in the genus *Basilina*.

### **aedeagal apodeme** (Figs. 7, 40) ap.

A long, flattened apodeme articulating with the base of the aedeagus, on which are inserted the muscles originating on the basal arc. Their contraction turns the phallobase by 90° around its basal articulation with the basal arc.

### **aedeagus** (Figs. 7, 40, 44-46) aed.

In most genera the intromittant organ of the male consists of two ventrally fused plates. It is closed dorsally by a membrane within which the ductus ejaculatorius opens. In some genera of the Cyclopodiinae this membrane forms an endophallus. In the subgenus *Cyclopodia* s.str. the aedeagus is wholly membranous with a rod-like sclerite (Figs. 44-46) in its wall and in the resting position is completely retracted inside the abdomen.

### **anal frame** (see *anal sclerite*)

### **anal lobes** (Pl. 1; Fig. 2) a.l.

The anal segment of the female in some species is protracted into shorter or longer lobes lateral to the anus. They bear setae and spines. The lobes are developed into long styles in some species of the genus *Stylidia* and were considered as generic characters, hence the name *Stylidia*. They are, however, of specific significance only and most species of the genus *Stylidia* have no styles. On the other hand, long styles occur also in other genera (e.g. *Basilina italica*).

### **anal sclerite** (Pl. 5; Figs. 52, 56, 371) a.s.

The anus of female Nycteribiidae is surrounded by a ring-shaped sclerite, the anal frame, which is open ventrally. It may be divided into several parts. A small isolated sclerite in the middle of the ventral side which may bear setae and spines is called the anal sclerite. It is particularly well developed in the genera *Eucampsipoda* and *Dipseliopoda* and the subgenus *Tripselia* of *Basilina*.

### **arista** (Figs. 15, 58-63) a.

The seta-like flagellum of the antenna in the Diptera Cyclorrhapha which is generally situated on the dorsal side of the third segment. It may be branched or simple. In the Nycteribiidae the arista is dendri-form in most genera and club-shaped with a few short branches in *Herskovitzia*.

### **basal arc** (Pl. 4; Fig. 40) b.a.

A horse-shoe-shaped or triangular sclerite lying posteriorly to sternite 5 of the male, forming an anterior frame around the genital area. The muscles of the aedeagal apodeme originate on it, and the phallobase articulates with it basally. It has been interpreted as the ninth sternite (hypandrium). Its shape varies in the different genera.

### **basal plate** (Fig. 46) b.p.

A sclerite of varying form, either square or horse-shoe-shaped, which forms the posterior part of the frame around the phallobase of the male genitalia.

### **basal segment** (see description of the antenna, pp. 8, 15, 16,)

### **claspers** (Fig. 7) cl.

Two movable processes articulating with the end of the anal segment of the male in all Nycteribiidae. Their function is to grasp the female during copulation. Their shape is of systematic importance and they may bear setae and spines of varying form. Their homology is doubtful (see p. 24). The term is used here in a purely descriptive sense.

### **connecting membrane** (of the male genitalia) (Figs. 41-45) c.m.

In the subfamily Nycteribiinae and in some species of the Cyclopodiinae, the aedeagus is connected with the phallobase by a short membrane which allows the protrusion of the aedeagus only for a short distance. In the genera *Eucampsipoda*, *Dipseliopoda* and the subgenus *Cyclopodia* s.str. the aedeagus is connected with the phallobase by a long tubular membrane which is invaginated inside the phallobase in the resting position. The membrane may bear long or short, backwards pointing spines. During copulation the aedeagus is protruded in these species for the whole length of the connecting membrane.

### **connexivum of the abdomen of the female** (Figs. 3, 37-38)

The abdomen of the female of the Nycteribiidae is covered partly by sclerotized plates, the number and size of which varies in the different genera. These plates are connected by a membranous and elastic part of the integument in which the endocuticula is very thick and the exocuticula very thin. This allows



## GLOSSARY

the extension of the abdomen when the female is gravid or after a blood meal. In the subgenus *Cyclopodia* s.str. most of the abdomen is formed by this connexivum, no sclerites existing between the basal sclerites and the anal segment. In the Nycteribiinae, 2-7 sclerites may be present before the anal segment and the connexivum is less extensively developed.

### **ctenidium** (see abdominal and thoracic ctenidium)

In addition to these two ctenidia, which are present in most genera, there exists a third ctenidium in some species of *Dipseliopoda* and *Cyclopodia* at the posterior margin of sternite 5 of the male (Figs. 767, 834).

### **endophallus** (Figs. 41-43, 770) e.

The widened apical part of the dorsal membrane of the aedeagus in the genera *Eucampsipoda* and *Dipseliopoda* and in some species of *Archinycteribia* and *Leptocyclopodia*.

### **eyes** (Pl. 3; Figs. 10-14, 312-320, 856-861)

The eyes of the Nycteribiidae consist in most species of a single or double lens. They are lacking in a number of genera. Only a single species is known so far which possesses two ocular frames on each side, each with two lenses (*Archinycteribia octophthalma* n.sp.). In species with double lenses, some specimens may possess 3 lenses. These eyes have to be considered as degenerate compound lateral eyes as they are innervated from the optic lobe of the protocerebrum. The ocular sclerite is either ring-shaped and lies inside the surface (*Eucampsipoda*, *Penicillidia*) or cylindrical and protrudes from it (*Basilis*, *Cyclopodia*). It may be pigmented or not. In previous classifications, the presence or absence of eyes was considered a generic character. Loss or reduction of eyes has apparently occurred independently in various genera, and other more fundamental characters prove that the presence or absence of eyes is not of generic significance.

### **genae** (Figs. 8-12, 14) g.

The lateral ventral part of the head which may bear setae or spines.

### **genital plates** (Figs. 47-57) d.p., g.p., v.p.

The genital opening of the female is protected or strengthened by a dorsal genital plate (d.p.) and a ventral genital plate (v.p.). In some genera only one of these plates is present. In *Nycteribia* and *Penicillidia* the dorsal plate bears setae or spines and covers the genital opening from above, sometimes projecting from the surface forming a lip. The ventral plate lies inside the surface. In some species genital plates are reduced to a group of setae or absent. In most species of Cyclopodiinae and in some species of the Nycteribiinae there is no dorsal plate and sternite 7 covers the genital opening from the ventral side. In these species sternite 7 often bears setae or spines. In the *parilis* group of *Nycteribia* sternites 7 and 8 are more or less closely fused and also function in a similar manner.

### **halter groove and its cover** (Figs. 781-783) h.g.

The halteres are situated in a hollow, lateral or posterior to the notopleural sutures. They originate from its median side near the posterior spiracle. This groove may be open or partly or completely closed by a sclerotized flap, the haltere groove cover, which originates at the median side of the groove. The cover is complete in *Penicillidia* and in some species of the subgenus *Cyclopodia* s.str., partly closed in other species of this subgenus and in the genus *Stereomyia* and open in all other genera.

### **labella** (Figs. 5, 8-11, 12-14)

The anterior narrow part of the proboscis. See description of the proboscis, p. 16.

### **lateral plates of the notopleural sutures** (Fig. 3) l.p.

Lateral to the notopleural sutures the integument of the thorax is sclerotized to a varying extent and these plates bear a diagonal row of setae in the Nycteribiinae, the notopleural setae.

### **mesonotum** (see description of the thorax, p. 17)

### **mesopleural suture** (Fig. 3) m.s.

A strongly sclerotized ridge, running from the anterior part of the lateral plates of the notopleural sutures to the anterior aspect of the second coxa.

### **notopleural setae** (Fig. 3) n.set.

A diagonal row of setae on the lateral plates, generally 6-15 in number in most Nycteribiinae. In *Penicillidia* their number is reduced or they are absent or reduced to minute spines in the male (*Penicillidia jenynsii*). In the Cyclopodiinae their number is reduced to 1-3 in most species and they are situated near the anterior margin of the haltere groove. Only in one species of *Cyclopodia* they form a group of 7-8 setae and in another species of the same group they are absent.

### **notopleural sutures** (Fig. 3) n.sut.

Two longitudinal sclerotized ridges on the dorsal side of the thorax which join posteriorly. The median space between them is considered as the mesonotum including the prothorax anteriorly near the head. The anterior spiracles (a.sp.) lie inside the notopleural sutures near their anterior end.

### **oblique sutures** (Figs. 4, 22) o.s.

The sternal plate of the thorax is divided into an anterior paired part and a posterior single part by a membranous strip which forms an angle with the apex anteriorly and runs from the median sternal suture to the posterior aspect of coxa 2. They are termed 'open' if the strip is membranous and 'closed' or 'fused' if the sternal sclerites have become secondarily fused, practically obliterating the slit.

### **ocular sclerite** (see eyes)



## GLOSSARY

### palps (Figs. 8-11, 12-14, 18-21) p.

The maxillary palps are one-segmented and bear one or several long terminal setae and shorter setae along the margin at the ventral side. The arrangement of the setae varies according to the genus.

### parameres (Figs. 7, 40) par.

Two sclerites articulating with the anterior part of the phallobase. They are movable in most species and are turned sideways and backwards during protrusion of the aedeagus. In some genera they are fused with the phallobase and are then immovable. Their function appears to be to protect the aedeagus in the resting position. In *Eucampsipoda* and in the subgenus *Cyclopodia* s.str. the parameres are reduced to small sclerites which close the genital opening when the genitalia are retracted.

### pegs (Fig. 712)

Very short, barrel-shaped spines. Their arrangement on the claspers of the male in the genus *Eucampsipoda* is of particular systematic importance (see p. 411).

### phallobase (Figs. 7, 41, 44, 46) ph.

A cone-shaped or triangular sclerite pertaining to the ninth sternite of the male, articulating with the basal arc, inside which lies the aedeagus. In the subgenus *Cyclopodia* s.str. the phallobase ends in an apical hook which may act as intromittant organ, the aedeagus being membranous.

### post-spiracular sclerite (Figs. 29-34) p.s.

A small strip-like or elliptical sclerite near the first abdominal spiracle. It bears a row of setae at its posterior margin in most genera, a single seta in *Eucampsipoda*, *Dipseliopoda* and in some species of the subgenus *Leptocyclopodia*. It has no setae in the subgenus *Cyclopodia* s.str. and is absent in *Penicillidia*. Its homologies have not been worked out and it may represent a remnant of sternite 1.

### pretarsus (Fig. 3) pt.

The terminal segment of the leg which bears 2 angular claws and 2 pulvilli, but no empodium, which is present in the Hippoboscidae and some genera of Streblidae.

### prothorax (Fig. 3)

This is very much reduced. It has apparently moved on to the dorsal surface of the thorax and the small sclerites around the insertion of the head may be considered its remnants.

### spiracles (Figs. 3, 793, 794)

There are 2 pairs of thoracic spiracles and 7 pairs of abdominal spiracles. The anterior thoracic spiracles lie inside the notopleural sutures lateral to the insertion of the head or slightly more posteriorly. The posterior thoracic spiracles lie at the anterior margin of the haltere groove. The abdominal spiracles generally lie inside the corresponding segment, in the male inside the tergites, in the female in the pleural membrane when the sclerites are reduced. They may be secondarily displaced. Thus in the

subgenus *Paracyclopodia* of *Basilina* spiracles 2-7 are concentrated in the posterior half or third of the abdomen.

### sternal median suture (Figs. 4, 22) s.m.s.

A median longitudinal suture dividing the sternal plate of the thorax into 2 lateral halves. It is strengthened internally by a sclerotized ridge which may be flattened in the middle. It has short vertical apodemes anteriorly and posteriorly.

### sternal plate (see description of thorax, p. 17)

### sternite 1+2 (Fig. 4) st. 1+2

The basal sternite of the abdomen of all Nycteribiidae which, except in the cases mentioned above, bears the abdominal ctenidium.

### tergites and tergal plates

On the tergum of the abdomen of the male a spiracle lies inside or alongside each of the sclerites. They thus apparently correspond to the abdominal segments. Tergite 1 and 2 may be fused and in this case 2 spiracles lie inside the combined tergite or spiracle 1 lies in the pleura close to the anterior margin of the sclerite. On the tergum of the abdomen of the female, the situation is often difficult to interpret because of the more or less extensive development of the abdominal connexivum and the disappearance of tergites. If a sclerite can be related to a certain spiracle, it is termed the corresponding tergite. If, however, the spiracles have been displaced or if it is not clear whether the sclerite consists of the tergite of one segment or has been formed by fusion of several tergites, the term 'tergal plate' is used with a number corresponding to the actual number of sclerites on the abdomen. The term is thus purely descriptive indicating the actual number and position of the sclerite on the abdomen, while the term 'tergite' expresses the relationship to a certain abdominal segment. The term 'tergal plate' is mainly used in the genus *Basilina* where the actual relationship of the sclerites is difficult to interpret. Thus, the sclerite in front of the anal segment is generally termed 'tergite 6', but it may be termed 'tergal plate 3' in species of *Basilina* and others where the large sclerite covering the greater part of the abdomen is termed 'tergal plate 2'.

### theca (Figs. 8-11, 13, 14) th.

The posterior thickened part of the proboscis. See description of the proboscis, p. 16.

### thoracic ctenidium (Pl. 3; Figs. 3, 23, 706) th.ct.

A row of curved spines situated on a movable sclerite at the anterior lateral parts of the thorax. This sclerite articulates with coxa 2 and has apparently developed as a differentiation of one of the coxal sclerites which has become movable and has taken over a new function, that of a grasping organ. Thoracic ctenidia are apparently a new adaptive development. They are peculiar to the family Nycteribiidae where they are present in all species except in the subgenus *Eremoctenia*.

## SYSTEMATICS AND NOMENCLATURE

Nomenclatorial questions concerning the identity of species have been discussed in previous papers (Theodor, 1955-1959, and Theodor & Moscona, 1954). A number of changes in the systematics of the family have been made here.

1. The family is divided into two subfamilies, the Nycteribiinae and the Cyclopodiinae, for the following reasons. The Nycteribiinae are parasites of Microchiroptera and the Cyclopodiinae of Megachiroptera. Specimens of Nycteribiinae are found occasionally on Megachiroptera and, conversely, specimens of Cyclopodiinae on Microchiroptera, but none of them have been found to occur on these hosts regularly, so that these records have to be considered as cases of straggling. Reduction of segmentation of the abdomen of the female, particularly of the tergites, is much more pronounced in the Cyclopodiinae. Thus, in the subgenus *Cyclopodia* s.str. there are no tergites between the basal tergite and the anal segment, while in other groups of the subfamily tergite 6 is present. In the Nycteribiinae there are 7 tergites before the anal segment in one genus, 2, 3 or 4 in a number of others. Tergite 6 has disappeared only in most American species of *Basilia* and in a few species of *Penicillidia*. Tergites 1 and 2 are fused in all 4 genera of the Cyclopodiinae in both sexes. In the Nycteribiinae tergite 1 of the abdomen is separate in most species and well developed with a marginal row of setae. Tergites 1 and 2 are fused in the male in some species of *Penicillidia*, while the females have a separate tergite 1. In *HersHKovitzia* tergites 1 and 2 are fused in both sexes, while in *Paracyclopodia* and *Stereomyia* fusion of tergites and sternites has progressed to such an extent that individual sclerites cannot be identified with certainty.

The dorsal pattern of the thorax differs markedly in both subfamilies. The notopleural sutures are more or less parallel or converge posteriorly in the Nycteribiinae and in most species have lateral plates which bear a diagonal row of 6-15 notopleural setae. The number of notopleural setae is reduced only in some species of *Penicillidia* and they are absent in a few other species of this genus. The number of notopleural setae is also reduced in *HersHKovitzia* and the form of the mesonotum is different. The mesopleural sutures originate at a point about the middle between the anterior and the posterior spiracle.

In the Cyclopodiinae, the notopleural sutures diverge posteriorly in 3 of the 4 genera and the mesopleural sutures originate far posteriorly, near the posterior spiracle. The number of notopleural setae is reduced to 1-3 in most species and they are absent in one species. In one species only there are 7-8 notopleural setae in a group. In *Archinycteribia* the form of the mesonotum is different and the mesopleural sutures originate further anteriorly, but the notopleural setae are placed far posteriorly and are 2-3 in number.

The tibiae in the Cyclopodiinae are more or less cylindrical, only slightly compressed laterally, with 2-3 bands of weaker integument in the middle and short setae along these bands. In the Nycteribiinae, the tibiae are strongly compressed laterally and bear several rows of long setae in the distal half of the ventral edge, in a few species in the middle of the tibia. The bands of



## SYSTEMATICS AND NOMENCLATURE

weaker integument are sharply marked in the Cyclopodiinae, much less sharply in the Nycteribiinae.

The chaetotaxy in both subfamilies differs in that the spines of thoracic and abdominal ctenidia are very coarse and blunt in the Cyclopodiinae and much thinner and sharply pointed in the Nycteribiinae. The hairy covering of the body differs in a similar manner.

Eyes are present in both subfamilies, but they are less reduced in the Cyclopodiinae, where they are found in all species, either as a single lens, as more or less developed double lenses and in one species with 4 lenses in each eye. The eyes are particularly well developed in the subgenus *Cyclopodia* s.str. which are parasites of the large Pteropids which generally roost in trees although some species do enter caves. In the Nycteribiinae there are several genera without eyes, one genus with eyes consisting of a single lens and one with double lenses on a common pigmented base. In *Herskovitzia* two species have a single lens, while eyes are absent in one species.

There are one or two genital plates in the Nycteribiinae, a dorsal plate with or without spines or setae and in some genera a ventral plate without spines. In the Cyclopodiinae there is no external dorsal genital plate and sternite 7 functions as genital plate which may bear an armature of spines or setae. A similar transformation of sternite 7 is found in the subgenus *Paracyclopodia* of *Basilia*. The male genitalia of the Nycteribiinae are all of the *Nycteribia* type, with a sclerotized aedeagus and apodeme, while in the Cyclopodiinae the structure of the genitalia varies widely, from the *Nycteribia* type to the *Eucampsipoda* type with endophallus and spine-bearing connecting membrane and to the *Cyclopodia* type with a retractable membranous aedeagus without apodeme. In addition there are some less important characters which distinguish the two subfamilies.

Many of the differences mentioned seem small and do not apply to all species, but in combination they serve to distinguish so clearly between the two subfamilies that there is never a doubt as to which subfamily a species belongs. Many characters vary widely in both groups. Thus, the head may be compressed laterally in both subfamilies, but a head which is compressed dorso ventrally exists only in the Cyclopodiinae and a broadly rounded head only in some genera of the Nycteribiinae. The oblique sutures of the thorax may be open or closed, a haltere groove cover may be present or absent in both groups. Although the characters given seem to hold for the majority of species, there are some cases of exceptional development which tend to modify and obliterate these characters to such an extent as to make them practically unrecognizable. Such a case is that of *Archinycteribia* in the Cyclopodiinae which differs in the form of the head, the form and fusion of the oblique sutures, the form of the mesonotum and some other characters from the other genera of the subfamily. Similarly, the small genera *Herskovitzia*, *Stereomyia* and the subgenus *Paracyclopodia* show some special developments of this type.

The differential characters of the subfamilies of Nycteribiidae are set out in Table 2 (p. 47).

2. The genus *Stylidia* was originally created by Westwood for *Stylidia biarticulata*. It was treated as a genus by Kolenati in 1863, but later considered as a subgenus by Speiser (1901), Theodor & Moscona (1954) and Theodor (1957). *Stylidia* is here again accorded generic rank, as the only reason for its inclusion in *Nycteribia*, the absence of eyes, has been shown to be of



## SYSTEMATICS AND NOMENCLATURE

no generic significance. Species with eyes and without eyes have been found to exist in the same genus (*Herskovitzia*), and a species with eyes consisting of a single ocellus and another with eyes consisting of 4 ocelli have been found in the genus *Archinycteribia*.

Similarly, *Tripselia* is considered as a subgenus of *Basilis* as it resembles species of the *bathybothyra* group of this genus very closely, except for the absence of eyes, which, as stated above, is not a character of generic significance.

3. The genus *Eremoctenia* was created by Scott (1917) because of the absence of eyes and of thoracic and abdominal ctenidia, although in other respects it closely resembles *Penicillidia*. Re-examination of the type material has shown that eyes do exist in *Eremoctenia*. They are small and inconspicuous, but not smaller than in, for instance, *Penicillidia buxtoni*. Absence of the thoracic ctenidium is a unique character, but seems only an extreme example of the general tendency to reduction which is very pronounced in *Penicillidia*. In all other characters, however, *Eremoctenia* is a typical *Penicillidia*, with a cover to the haltere groove, lacking a post-spiracular sclerite, with tibiae typical for the genus and with male genitalia very similar to those of other species of the genus. The segmentation of the abdomen of the female is also typical for the genus *Penicillidia*. For these reasons *Eremoctenia* is considered as a subgenus of *Penicillidia*.

4. The new genus *Stereomyia* has been created as the species concerned differs so greatly from all others that it could not be placed into any of the existing genera without completely disrupting their definition. It resembles *Penicillidia* in habitus, but shows a closer relation to species of *Tripselia* in other respects.

## DISTRIBUTION

The only zoogeographical analysis of the family attempted so far is that of Speiser (1908). Speiser knew only about 50 of the nearly 200 species of today and many of these were wrongly identified or placed in the wrong genus, so that a completely erroneous picture of the distribution of the family resulted. The same applies to Scott's discussion of the distribution of the Oriental species (1925).

The material dealt with in this catalogue enables one for the first time to present a picture of the distribution of the whole family. Zoogeographical data concerning various groups have been discussed in previous papers (Theodor, 1952-1963).

Table 1 gives the distribution of the various genera and groups throughout the zoogeographical regions. The definition of these groups on a purely morphological basis has been confirmed by their distribution.

The following conclusions can be drawn from the material available:

1. The centre of origin of the family apparently lies in the Malaysian Subregion. 67 species and subspecies have been found mainly in this area and in other parts of the Oriental Region, 38 in the Pacific Region, 35 in the Ethiopian Region and 20 and 10 species respectively in the Western and Eastern parts of the Palaearctic Region.

2. The *schmidlii* group of the subgenus *Nycteribia* is restricted to the Ethiopian Region and only one species has spread into the Mediterranean and Southern Europe. The *parilis* group is mainly Pacific, with a single species also occurring in the Malaysian Subregion.

3. The genus *Stylidia* has 16 species in the Oriental Region and has apparently spread from there into the Eastern Palaearctic (4 species) and into the Ethiopian Region (6 species and 2 subspecies). The species in the Western Palaearctic region seem to have come mainly from the Oriental Region through the Western Himalayas.

4. The *bathybothyra* group of *Basilia* has 5 species in the Oriental Region, where it probably originated, together with *Tripselia*, and most likely spread from there into the Ethiopian Region (3 species). One species exists in the Middle East and another in Afghanistan. Both show a closer similarity to the Ethiopian than to the Oriental species. It thus seems probable that these two species have come from Africa at a later date. This is corroborated by the situation in other groups of insects, for instance *Phlebotomus*, where a species in Iraq resembles the African species of a certain group more closely than the Indian one.

Distribution in other genera seems to have taken place on similar lines as indicated in the table. Only the subgenera *Tripselia* and *Cyclopodia* s.str. have more species in the Pacific Region than in the Oriental Region.

In many cases it is doubtful whether a certain form should be considered as a species or a subspecies. This applies particularly to some American species. However, our knowledge of the distribution of many species and of the range of variation within the species is often so incomplete that no conclusions can be drawn at present.

# DISTRIBUTION

TABLE I  
No. of Species and Subspecies in the various Zoogeographical Regions

	Palearctic		Ethiopian Madagascar	Oriental	Pacific	American	
	West	East				North	South
<i>Nycteribia</i>							
<i>pedicularia</i> group	4	4		5			
<i>schmidlii</i> group	1 ←		5				
<i>parilis</i> group				1 ←	6		
<i>Acrocholidia</i>	2						
<i>Stylidia</i>							
<i>biarticulata</i> group	4	4	5 ←	16	2		
<i>scissa</i> group			4				
<i>Basilia</i>							
<i>nattereri</i> group	3			4			
<i>eileuæ</i> group				3			
<i>bathybothyra</i> group	2 ←		3 ←	5		2	
<i>antrozoi</i> group						2	
<i>forcipata</i> group						4	
<i>ferruginea</i> group							5
<i>speiseri</i> group							16
<i>Conotibia</i>				1			
<i>Paracyclopodia</i>			3	1			
<i>Tripselia</i>			3 ←	7 ←	10		
<i>Stereomyia</i>					1		
<i>Hershkovitzia</i>							3
<i>Penicillidia</i>							
<i>conspicua</i> group	3	1					
<i>fulvida</i> group			3				
<i>jenynsii</i> group		1	1 ←	6	4		
<i>Eremoctenia</i>				1			
<i>Archinycteribia</i>				1	1		
<i>Eucampsipoda</i>	1 ←		2 ←	5	1		
<i>Dipseliopoda</i>			3				
<i>Cyclopodia</i>							
<i>sykesii</i> group				3 ←	8		
<i>pembertoni</i> group					2		
<i>greeffi</i> group			3				
<i>tenuis</i> group				1 ←	3		
<i>Leptocyclopodia</i>				6	2		
	20	10	35	66	39	8	24

The numbers in the table do not exactly correspond to those in the list. Some species are counted twice as they occur in two zoogeographical regions and a few species of uncertain position have not been included.



## DISTRIBUTION

Many species have a more or less wide distribution within a zoogeographical region, but only a single species is known, *Basilina* (*Tripselia*) *blainvillii*, which occurs in two subspecies both in the Ethiopian and in the Oriental Regions. The apparently world-wide distribution of some species mentioned by earlier authors has proved to be based on wrong identifications or on non-recognition of new species. Thus, *Eucampsipoda hyrtlui* is restricted to the Middle East and records of this species from the Ethiopian and the Oriental Regions refer to other species.

The distribution of many species is much narrower than that of their hosts. This is particularly well demonstrated in the case of *Cyclopodia greeffi* and of *Basilina* (*Tripselia*) *blainvillii*, both of which occur between lat. 10° North and South in Tropical Africa, while their specific hosts are distributed all over Ethiopian Africa, from the Sahara to the Cape (see maps 1-6).

## HOST-PARASITE SPECIFICITY

Detailed information about this has been given in a previous paper (Theodor, 1957) and with the descriptions. It appears that there are three types or degrees of host-parasite specificity in the family:

1. Restriction to one host species.
2. Restriction to a genus or a family of bats.
3. Lack of specificity.

This last type is well demonstrated by *Penicillidia fulvida*, which has been found on 14 species of bats, belonging to 7 genera of 5 different families.

Specificity seems in some cases determined, partly at least, by ecological factors more than by true or physiological specificity.

No Nycteribiid has been found regularly, or even feeding, on any host other than Chiroptera. There are a number of records in the material examined from 'Tupaia', 'Pangolin', 'Mouse deer', and 'Paradoxurus', but all these have to be considered as cases of straggling without any biological significance.

## MEASUREMENTS

The total length given for a species is the average of as many measurements as possible. The length of a species varies little in a population, as the development of the larva does depend only very little on outside conditions, but different populations may vary considerably in their measurements. The total length is measured from the anterior margin of the sternal plate of the thorax to the tip of the anal segment, including processes, if any. If available, the length of males is given, as extension of the abdomen is much smaller than in the females where gravidity may cause great increase in size of the abdomen. The abdomen of females is membranous to a smaller or greater extent and the abdomen of a newly hatched female before feeding may be one-half the length of that of a fully gravid female.

The length of the thorax is measured in the mid-line of the sternal plate and its width at its greatest extent, generally in its posterior part.

The terms 'long' and 'short' are used in the longitudinal direction while 'wide' is used for the transverse direction. Thus, a transversely lying sclerite may be as 'wide' as the abdomen, but very 'short' in the longitudinal direction.

The angulate claspers of the *parilis* group of *Nycteribia* are measured in a straight line from the tip to the posterior corner of the base near the anus.

## TECHNIQUE

Nycteribiids should be kept in 70% alcohol. If more than a single specimen is available, some should be mounted in Canada Balsam after clearing in KOH. Care should be taken to bend the head forward and to avoid compressing the specimen dorso ventrally.

The male genitalia should be dissected out and should be mounted in side view in Balsam under a separate cover glass. They can also be dissected out from alcohol specimens and mounted in Balsam, while the whole insect is kept in alcohol. This procedure is preferable when only a single specimen is available. Nycteribiidae should not be pinned or kept dry. They shrink considerably, particularly the abdomen of the female, and the legs frequently cover areas to be examined.

## BIOLOGY

Nycteribiidae pass practically all their life on the host. They feed frequently, so that there is always fresh blood in their intestine and die within 1 or 2 days when removed from the host. The female leaves the host only in order to deposit the larvae in the neighbourhood of the bat's roosting place. The larvae are deposited on the wall of caves or, in the case of the parasites of Pteropidae roosting on trees, on branches or leaves. The larva is pressed to the substrate so that its ventral surface is flattened. The puparia of only a few species are known. They are black, shallowly convex dorsally, elliptical, with a round or triangular operculum which is opened by the action of the forelegs which are folded over the head. The insect hatches after 2 or 3 weeks in species in temperate climates and searches for its host after hardening.

Both sexes seem to occur in about equal numbers. In very many instances a male and a female or males and females in roughly equal numbers are found on the same individual bat.

Very few studies on the biology of the Nycteribiidae have been published. Rodhain & Bequaert (1915) record some observations on the biology of *Cyclopodia greeffi*. Scott (1917) summarizes the biological data known to him from the literature, and Hase (1931) studied the behaviour and the physiology of digestion of an American species of *Basilis*.

## DESCRIPTIONS

These are given in shortened form, except for new species and for the typical species of a genus, subgenus or group. In general, arrangement is according to genera and groups and



## REFERENCES

alphabetically inside the groups. In some cases, the typical species has been given first when this seemed to make it possible to shorten the other descriptions. The characters given in the keys and in the descriptions, together with the figures and the information about distribution, should make identification possible in most cases. In some cases, if closely related species of the same area are concerned, the original, more detailed descriptions should be consulted.

## REFERENCES

- Crampton, G. C. (1942). The external morphology of the Diptera. *Bull. Connecticut Geol. Nat. Hist. Survey*, **64**, 10.
- Hase, A. (1931). Ueber die Lebensgewohnheiten einer Fledermausfliege in Venezuela; *Basilina bellardii* Rondani. *Zeitschr. f. Parasitenk.* **3**, 220.
- Jobling, B. (1928). The structure of head and mouthparts in the Nycteribiidae (Diptera Pupipara). *Parasitology*, **20**, 254.
- Jobling, B. (1929). A comparative study of the structure of the head and mouthparts in the Streblidae (Diptera Pupipara). *Parasitology*, **21**, 417.
- Nussbaum, R. (1960). Der Thorax von *Basilina nana* (Diptera, Nycteribiidae). *Zool. Jahrb.* **78**, 313.
- Rodhain, J. & Bequaert, J. (1915). Observations sur la biologie de *Cyclopodia greeffi* Karsch. *Bull. Soc. zool. France*, **40**, 248.
- Rothschild, N. C. (1917). Convergent development among certain ectoparasites. *Proc. Ent. Soc. (London)*, **1916**, 141.
- Scott, H. (1917). Notes on Nycteribiidae, with descriptions of two new genera. *Parasitology*, **9**, 593.
- Scott, H. (1925). Zoogeographical and systematic notes on the Nycteribiidae of India, Ceylon and Burma. *Rec. Ind. Mus.*, **27**, 351.
- Snodgrass, R. E. (1935). *Principles of Insect Morphology*. McGraw Hill Co., New York.
- Snodgrass, R. E. (1957). A revised interpretation of the external reproductive organs of male insects. *Smithson. Misc. Coll.*, **135**, no. 6.
- Speiser, P. (1901). Ueber die Nycteribiiden. *Arch. Naturgesch.*, **67**, 11.
- Speiser, P. (1908). Die geographische Verbreitung der Diptera Pupipara und ihre Phylogenie. *Zeitschr. wiss. Insektenbiol.*, **4**, 241, 301, 420, 437.
- Theodor, O. (1952). On the zoogeography of some groups of Diptera in the Middle East. *Rev. Facult. Sciences Univ. Istanbul (B)*, **27**, 107.
- Theodor, O. (1953). On the structure of the genitalia in the Nycteribiidae (Diptera, Pupipara). *Trans. IXth Internat. Congr. Entom. (Amsterdam)*, **2**, 27.
- Theodor, O. (1955). On the genus *Eucampsipoda* Kol. and *Dipseliopoda* n.g. (Nycteribiidae). *Parasitology*, **45**, 195.
- Theodor, O. (1957). Parasitic adaptation and host-parasite specificity in the Pupiparous Diptera. *I. Symposium on host specificity among parasites of vertebrates. Neuchâtel.*
- Theodor, O. (1959). A revision of the genus *Cyclopodia* (Nycteribiidae). *Parasitology*, **49**, 242-308.
- Theodor, O. (1963). Philippine batflies of the family Nycteribiidae. *Fieldiana Zool.*, **42**, 151.
- Theodor, O. & Moscona, A. (1954). On bat parasites in Palestine. 1. Nycteribiidae, Streblidae, Hemiptera, Siphonaptera. *Parasitology*, **44**, 159.
- Tuxen, S. L. (1956). *Taxonomist's Glossary of Genitalia in Insects*. Munksgaard, Copenhagen.

## LIST OF THE FAMILY NYCTERIBIIDAE

Subfamily NYCTERIBIINAE Westwood  
Genus *NYCTERIBIA* Latreille, 1796  
Subgenus *NYCTERIBIA* s.str.

### *pedicularia* group

1. *N. allotopa* Speiser, 1901.  
India, Ceylon, east to the Philippines, Japan.
2. *N. allotopoides* Theodor, 1963.  
Philippines, Burma.
3. *N. dentata* n.sp.  
Kashmir.
4. *N. formosana* (Karaman, 1939).  
China, Formosa.
5. *N. japonica* n.sp.  
Japan, Korea.
6. *N. kolenatii* Theodor & Moscona, 1954.  
Europe.
7. *N. latreillii* (Leach, 1817).  
Continental Europe, North Africa, West Asia.
8. *N. parvula* Speiser, 1901.  
India, Ceylon, east to the Philippines, Japan.
9. *N. parvuloides* Theodor, 1963.  
Philippines, Burma.
10. *N. pedicularia* Latreille, 1805.  
Southern Europe, North Africa, West Asia.
11. *N. triangularis* n.sp.  
Malaya.

### *schmidlii* group

12. *N. capensis* (Karaman, 1939).  
South Africa.
13. *N. exacuta* Theodor, 1957.  
French Guinea.
14. *N. latiterga* Theodor, 1957.  
Kenya.
15. *N. schmidlii schmidlii* Schiner, 1853.  
Continental Europe, North Africa, West Asia.
- 15a. *N. schmidlii scotti* Falcoz, 1923.  
Ethiopian Africa.
16. *N. stylidiopsis* Speiser, 1908.  
Madagascar.

### *parilis* group

17. *N. bakeri* Scott, 1932.  
New Hebrides.
  18. *N. papuensis* n.sp.  
New Guinea.
  19. *N. parilis* Walker, 1861.  
Amboina, Australia.
  20. *N. rothschildi* n.sp.  
Solomon Islands.
  21. *N. sarasini* Falcoz, 1923.  
New Caledonia, New Hebrides.
  22. *N. spinosa* n.sp.  
Queensland, Australia.
- Subgenus *ACROCHOLIDIA* Kolenati, 1857
23. *N. vexata* Westwood, 1835.  
Continental Europe, North Africa, West Asia.

24. *N. lindbergi* Aellen, 1959.  
Afghanistan, Himalayas.

Genus *STYLIDIA* Westwood, 1840

### *biarticulata* group

1. *S. amandalei* (Scott, 1925).  
Bengal.
2. *S. biarticulata* (Hermann, 1804).  
Europe, North Africa, West Asia.
3. *S. biloba* (Theodor & Moscona, 1954).  
Israel.
4. *S. brachyacantha* (Theodor, 1963).  
Philippines.
5. *S. caudata* n.sp.  
Burma.
6. *S. ceylonica* n.sp.  
Ceylon.
7. *S. chinensis* (Theodor, 1954).  
China, Yunnan.
8. *S. curvata* n.sp.  
New Guinea.
9. *S. euxesta euxesta* (Speiser, 1901).  
Burma.
- 9a. *S. euxesta siamensis* subsp.n.  
Malaya, Thailand.
- 9b. *S. euxesta* subsp.?  
India.
10. *S. fraterna* n.sp.  
Malaya.
11. *S. hindlei* (Scott, 1936).  
China, Japan.
12. *S. incisa* n.sp.  
India, Burma.
13. *S. inopinata* (Theodor, 1957).  
Ethiopian Africa.
14. *S. integra* (Theodor & Moscona, 1954).  
Arabia, Egypt, Israel.
15. *S. maxima* n.sp.  
Thailand.
16. *S. mindanaensis* (Theodor, 1963).  
Philippines.
17. *S. nuditerga* n.sp.  
N.W. Himalayas.
18. *S. ornata* (Theodor, 1954).  
China, Yunnan.
19. *S. ovalis* (Theodor, 1957).  
Ethiopian Africa.
20. *S. phillipsi* (Scott, 1925).  
India, Ceylon.
21. *S. phthisica* (Speiser, 1907).  
Amboina.
22. *S. psiloteria* n.sp.  
Java.
23. *S. rotundata* (Theodor, 1957).  
Ethiopian Africa.
24. *S. szechuana* (Theodor, 1954).  
China, Szechuan.

# NYCTERIBIIDAE

25. *S. styligera* n.sp.  
Malaya.
26. *S. tecta* (Theodor, 1957).  
Ethiopian Africa.
27. *S. tonkinensis* n.sp.  
Indochina.
28. *S. torresi* n.sp.  
North Australia, New Guinea.
29. *S. traubi* n.sp.  
Malaya.

## *scissa* group

30. *S. hoogstraali* (Theodor, 1957).  
Ethiopian Africa.
31. *S. scissa scissa* (Speiser, 1901).  
South Africa.
- 31a. *S. scissa rhodesiensis* (Theodor, 1957).  
East Africa.
- 31b. *S. scissa sudanica* (Theodor, 1957).  
East and Central Africa.

Genus *BASILIA* Miranda Ribeiro, 1903  
Subgenus *BASILIA* s.str.

## *nattereri* group

1. *B. hispida* n.sp.  
Malaya, Java.
2. *B. italica* Theodor, 1954.  
Italy, Switzerland, Czechoslovakia.
3. *B. magnocula* (Schuurmans Stekhoven, 1942).  
Java, Moluccas.
4. *B. monocula* n.sp.  
Malaya.
5. *B. nana* Theodor & Moscona, 1954.  
Europe, Israel.
6. *B. nattereri* (Kolenati, 1857).  
Continental Europe.
7. *B. pudibunda* Schuurmans Stekhoven, 1941.  
Thailand, Indochina, Borneo, Sumatra.

## *eileenae* group

8. *B. borneensis* n.sp.  
Borneo.
9. *B. eileenae* Scott, 1936.  
Ceylon.
10. *B. pectinata* n.sp.  
Java, Thailand.

## *bathybothyra* group

11. *B. afghanica* n.sp.  
Afghanistan.
12. *B. ansifera* Theodor, 1956.  
Ethiopian Africa.
13. *B. bathybothyra* Speiser, 1907.  
Calcutta.
14. *B. daganiae* Theodor & Moscona, 1954.  
Turkey, Cyprus, Israel, Egypt.
15. *B. fletcheri* (Scott, 1914).  
India.
16. *B. majuscula* (Edwards, 1919).  
India, Java, Philippines.
17. *B. meridionalis* Theodor, 1956.  
Ethiopian Africa.
18. *B. pumila* (Scott, 1914).  
India, Ceylon.

19. *B. punctata* Theodor, 1956.  
India, Ceylon.
20. *B. robusta* Theodor, 1956.  
Ethiopian Africa.
21. *B. seminuda* Theodor, 1956.  
India.

## Subgenus or group not certain

22. *B. tenuispina* Theodor, 1957.  
Congo.

## *antrozoi* group

23. *B. antrozoi* (Townsend, 1893).  
South-West United States, Mexico.
24. *B. pizonychus* Scott, 1939.  
Mexico.

## *forcipata* group

25. *B. anomala* Guimarães & d'Andretta, 1956.  
Mexico, Guatemala.
26. *B. forcipata* Ferris, 1924.  
South-West United States, Mexico.

## *ferruginea* group

27. *B. bellardii* (Rondani, 1878).  
Mexico.
28. *B. bequaerti* Guimarães & d'Andretta, 1956.  
Paraguay, Colombia, Venezuela.
29. *B. boardmanni* Rozeboom, 1934.  
Florida, Illinois, U.S.A.
30. *B. corynorhini* (Ferris, 1916).  
California, Texas.
31. *B. ferruginea* Mir. Ribeiro, 1903.  
Brazil, Paraguay, Cuba(?).
32. *B. neamericana* Schuurmans Stekhoven, 1951.  
Argentina.
33. *B. plaumanni* Scott, 1940.  
Brazil, Paraguay.
34. *B. rondanii* Guimarães and d'Andretta, 1956.  
Texas, South to Honduras.
35. *B. silvae* (Brèthes, 1913).  
Chile.
36. *B. wenzeli* Guimarães & d'Andretta, 1956.  
Colombia, Venezuela.

## *speiseri* group

37. *B. carteri* Scott, 1936.  
Brazil, Paraguay, Argentina.
38. *B. constricta* Guimarães & d'Andretta, 1956.  
Colombia, Venezuela, Ecuador, Peru.
39. *B. costaricensis* Guimarães & d'Andretta, 1956.  
Costa Rica.
40. *B. curranii* Guimarães, 1943.  
South Brazil, Argentina.
41. *B. dubia* Guimarães & d'Andretta, 1956.  
Brazil, Peru.
42. *B. dunni* Curran, 1935.  
Panama (= *carteri* ?).
43. *B. ferrisi* Schuurmans Stekhoven, 1931.  
Costa Rica (= *myotis* ?).
44. *B. guimaraesi* (Schuurmans Stekhoven, 1951).  
Brazil.
45. *B. hughscotti* Guimarães, 1946.  
South Brazil.
46. *B. juquiensis juquiensis* Guimarães, 1946.  
South Brazil.



## NYCTERIBIIDAE

- 46a. *B. juquiensis anceps* Guimarães & d'Andretta, 1956.  
Colombia, Peru.  
47. *B. mirandaribeiroi* Guimarães, 1942.  
South Brazil.  
48. *B. myotis* Curran, 1935.  
Central America, Colombia, Venezuela, Peru  
(= *ferrisi* ?).  
49. *B. peruvia* Guimarães & d'Andretta, 1956.  
Peru.  
50. *B. speiseri* (Miranda Ribeiro, 1907).  
Argentina, Brazil, Paraguay.  
*B. travassosi* Guimarães, 1938.  
51. N.E. Brazil, Ceara, Rezife.

Position uncertain

52. *B. flava* Weyenbergh, 1881.  
Argentina.  
53. *B. rugosa* Schuurmans Stekhoven, 1942.  
Peru.

Subgenus *CONOTIBIA* n. subgen.

54. *B. compar* n.sp.  
Malaya.

Subgenus *PARACYCLOPODIA* Scott, 1917

55. *B. bouvieri* (Falcoz, 1924).  
Ethiopian Africa.  
56. *B. glabra* Theodor, 1957.  
Congo.  
57. *B. madagascarensis* Theodor, 1957.  
Madagascar.  
58. *B. roylli roylli* (Westwood, 1835).  
India, China, Java, Burma.  
58a. *B. roylli burmensis* Theodor, 1954.  
India, Burma.

Subgenus *TRIPSELIA* Scott, 1917

59. *B. aequisetosa* (Theodor, 1956).  
Ethiopian Africa.  
60. *B. blainvillii blainvillii* (Leach, 1817).  
Ethiopian Africa, Mauritius, Madagascar.  
60a. *B. blainvillii amiculata* (Speiser, 1907).  
India, Ceylon, Burma, Sumatra, Borneo.  
61. *B. brevipes* (Theodor, 1956).  
Borneo, India.  
62. *B. burrelli* (Musgrave, 1927).  
Australia.  
63. *B. coronata coronata* n.sp. and sub sp.  
Borneo.  
63a. *B. coronata indivisa* n. subsp.  
Malaya.  
64. *B. echinata* (Theodor, 1957).  
West Africa.  
65. *B. falcozi* (Musgrave, 1925).  
Australia.  
66. *B. halei* (Musgrave, 1927).  
Australia.  
67. *B. hirsuta* (Theodor, 1956).  
New Guinea.  
68. *B. horrida* (Schuurmans Stekhoven, 1958).  
New Guinea.  
69. *B. longispinosa* (Musgrave, 1927).  
Australia.  
70. *B. major* n.sp.  
Borneo.

71. *B. multispinosa* (Musgrave, 1927).  
Australia.  
72. *B. musgravei* n.sp.  
Australia.  
73. *B. peselefantis* (Schuurmans Stekhoven, 1942).  
Sumatra.  
74. *B. quadrata* n.sp.  
New Guinea.  
75. *B. triseriata* n.sp.  
Malaya.  
76. *B. troungtoni* (Musgrave, 1927).  
Australia.

Genus *HERSHKOVITZIA* Guimarães &  
Andretta, 1956

1. *H. coeca* n.sp.  
America.  
2. *H. inaequalis* n.sp.  
Peru.  
3. *H. primitiva* Guimarães & d'Andretta, 1956.  
Peru.

Genus *STEREOMYIA* n. gen.

1. *S. armata* n.sp.  
New Guinea.

Genus *PENICILLIDIA* Kolenati, 1863  
Subgenus *PENICILLIDIA* s.str.

*conspicua* group

1. *P. conspicua* Speiser, 1901.  
Continental Europe, North Africa, West Asia.  
2. *P. dufourii dufourii* (Westwood, 1835).  
Continental Europe, North Africa, West Asia to  
the Himalayas.  
2a. *P. dufourii tainani* Karaman, 1939.  
Formosa, China.  
3. *P. monoceros* Speiser, 1900.  
Europe.

*fulvida* group

4. *P. decipiens* Theodor, 1957.  
Madagascar.  
5. *P. fulvida* (Bigot, 1885).  
Ethiopian Africa.  
6. *P. pachymela* Speiser, 1901.  
Ethiopian Africa.

*jenynsii* group

7. *P. actedona* n.sp.  
Thailand.  
8. *P. buxtoni* Scott, 1932.  
New Hebrides.  
9. *P. heinrichi* n.sp.  
Burma.  
10. *P. indica* Scott, 1925.  
Ceylon, India.  
11. *P. jenynsii* (Westwood, 1835).  
China, Japan, Formosa.  
12. *P. leptothrinax* Speiser, 1908.  
Madagascar.  
13. *P. miriamae* n.sp.  
Solomon Islands.  
14. *P. oceanica oceanica* (Bigot, 1885).  
Australia, New Caledonia.

## NYCTERIBIIDAE

- 14a. *P. oceanica acuminata* Theodor, 1963.  
Philippines.
15. *P. oligacantha* Theodor, 1963.  
Philippines.
16. *P. spinifera* n.sp.  
Solomon Islands.  
  
Subgenus *EREMOCTENIA* Scott, 1917
17. *P. progressa* (Scott, 1917).  
Amboina.  
  
Subfamily CYCLOPODIINAE n. subfam.  
Genus *ARCHINYCTERIBIA* Speiser, 1901
1. *A. actena* Speiser, 1901.  
New Britain.
2. *A. octophthalma* n.sp.  
Malaya, Borneo.  
  
Genus *EUCAMPSIPODA* Kolenati, 1857
1. *E. africana* Theodor, 1955.  
Ethiopian Africa.
2. *E. hyrtlui* (Kolenati, 1856).  
Syria, Israel, Egypt, Arabia.
3. *E. inermis* Theodor, 1955.  
Java, Philippines, New Guinea.
4. *E. latisterna* Schuurmans Stekhoven, 1938.  
Ceylon, India, Java, Burma, Thailand.
5. *E. madagascarensis* Theodor, 1955.  
Madagascar.
6. *E. penthetoris* Theodor, 1955.  
Borneo, Malaya.
7. *E. philippinensis* Ferris, 1924.  
Philippines.
8. *E. sundaica* Theodor, 1955.  
Malaya, Burma, India, Sumatra, Philippines.  
  
Genus *DIPSELIPODA* Theodor, 1955
1. *D. arcuata* Theodor, 1955.  
Ethiopian Africa.
2. *D. biannulata* (Oldroyd, 1953).  
Ethiopian Africa.
3. *D. setosa* Theodor, 1955.  
Ethiopian Africa.  
  
Genus *CYCLOPODIA* Kolenati, 1863  
Subgenus *CYCLOPODIA* s.str.
- sykesii* group
1. *C. albertisii* Rondani, 1878.  
Australia, Moluccas, Palau Islands, New Guinea.
2. *C. australis* Theodor, 1959.  
Australia.
3. *C. bougainvillensis* Theodor, 1959.  
Solomon Islands.
4. *C. horsfieldi* de Meijere, 1899.  
Malaya, Philippines.
5. *C. inclita* Falcoz, 1927.  
Samoa, Fiji Islands.
6. *C. minor* Speiser, 1900.  
New Britain, Admiralty Islands.
7. *C. oxycephala* (Bigot, 1860).  
New Caledonia, New Hebrides.
8. *C. ponapensis* Theodor, 1959.  
Ponape Islands.
9. *C. similis* Speiser, 1900.  
New Britain, Tanimbar Island.
10. *C. sykesii* (Westwood, 1835).  
India, Ceylon, Burma.  
  
*pembertoni* group
11. *C. macracantha* Theodor, 1959.  
Solomon Islands.
12. *C. pembertoni* Scott, 1932.  
Fiji Islands.  
  
*greeffi* group
13. *C. dubia* (Westwood, 1835).  
Madagascar.
14. *C. greeffi greeffi* Karsch, 1884.  
Ethiopian Africa.
- 14a. *C. greeffi arabica* Theodor, 1954.  
Arabia.  
  
*tenuis* group
15. *C. (?) inflatipes* Speiser, 1900.  
New Guinea.
16. *C. solomonarum* Theodor, 1959.  
Solomon Islands.
17. *C. tenuis* Schuurmans Stekhoven & Hardenberg,  
1938.  
Java, Moluccas.
18. *C. truncata* Theodor, 1959.  
New Britain.  
  
Subgenus *LEPTOCYCLOPODIA* Theodor, 1959
19. *C. brachythrinx* Theodor, 1959.  
Borneo.
20. *C. ferrarii ferrarii* (Rondani, 1878).  
India, Ceylon, Malaya.
- 20a. *C. ferrarii palawanensis* Theodor, 1959.  
Palawan, Philippines.
21. *C. macrura* Speiser, 1900.  
Sumbawa, New Guinea, New Britain.
22. *C. obliqua* Theodor, 1959.  
Malaya.
23. *C. orthotricha* Theodor, 1959.  
Solomon Islands.
24. *C. simulans* Theodor, 1959.  
Philippines.

# FAMILY NYCTERIBIIDAE Westwood, 1840

Head either laterally compressed, rounded or flattened dorso ventrally, kept folded back over the thorax in the resting position, moved forward by 180° for the biting position. Eyes either absent or present in the form of reduced compound eyes with single or double lenses (with 4 lenses in one species). Dorsal ocelli absent. Antennae apparently 2-segmented, second segment invaginated into the first. Arista dendriform. (Figs. 15, 16, 58-63.) Sternites of thorax fused into a broad plate. Dorsal surface membranous in its greater part. Two sclerotized ridges, the notopleural sutures, include a medium membranous space, the mesonotum. Two pairs of thoracic spiracles, the anterior inside the notopleural suture, the posterior at the haltere groove. Wings absent, halteres present. A pair of movable ctenidia present at each lateral anterior part of the thorax in all but one subgenus. Legs inserted on the dorsal surface, giving the insects a spider-like appearance. Empodium absent. Abdomen consisting of 7 segments in addition to the anal segment. 7 pairs of abdominal spiracles. The segments are clearly marked on the dorsum of the male, but reduced in number by fusion or membranization on the venter of the male and in the abdomen of the female. A ctenidium is present on sternite 1+2 in most species, reduced in some genera and absent in others.

TABLE 2  
*Differential characters of the subfamilies of Nycteribiidae*

	Nycteribiinae	Cyclopodiinae
Hosts	Insectivorous bats (Microchiroptera)	Fruit bats (Megachiroptera)
Head	Laterally compressed or rounded, never dorso-ventrally compressed	May be dorso ventrally compressed
Tibiae	Strongly compressed laterally, with several rows of long setae. Bands of weaker integument not strongly marked	Cylindrical, with 2-3 bands of weaker integument in the middle and short setae near the bands
Notopleural sutures	Parallel or converging posteriorly	Diverging posteriorly (except in <i>Archinycteribia</i> )
Notopleural setae	Forming a single row of 6-15 setae in most species, several rows in a few species, reduced or absent in a few other species	Reduced in number (except in one species)
Tergites 1 and 2	Separate in most species. Fused in both sexes of <i>Herskovitzia</i> . Fused in the male only in some species of <i>Penicillidia</i>	Fused in all species in both sexes
Segmentation of female abdomen	3 or 4 sclerites anterior to the anal segment in most species, 7 sclerites in <i>Herskovitzia</i> . Only 2 in a few species of <i>Penicillidia</i> and <i>Basilia</i>	Much reduced
Chaetotaxy	Setae fine. Spines of the ctenidia narrow and sharply pointed	Setae coarse. Spines of the ctenidia coarse and blunt
Genitalia	Only <i>Nycteribia</i> type	<i>Nycteribia</i> , <i>Eucampsipoda</i> or <i>Cyclopodia</i> type



## NYCTERIBIIDAE

### KEY TO THE GENERA AND SUBGENERA OF NYCTERIBIIDAE

1. Seven tergites of similar form on the dorsum of the female abdomen before the anal segment (tergites 1 and 2 fused), tibiae 1 and 2 of different form. Tibia 2 conical or subconical, with short setae in the middle or in the basal half, tibia 1 with long setae in the distal half. Sternite 5 of the male with a deep indentation of the posterior margin which has rows of spines at the sides.  

**Herskovitzia** (p. 345)

Only 2, 3 or 4 tergites of different form on the female abdomen anterior to the anal segment. All 3 tibiae of similar form in all species, except the subgenus *Conotibia* of *Basilina*. 2
2. Eyes absent. 3  
 Eyes present. 7
3. Tibiae short, curved ventrally, 2-3.5 times as long as wide. 3-4 tergites on the female abdomen before the anal segment. 4  
 Tibiae longer and narrower, 4-8 times as long as wide. 5
4. Tibiae nearly semicircular, 2-2.5 times as long as wide. 3 or 4 tergites on the female abdomen. Head membranous in the anterior dorsal part. Row of setae at the posterior margin of the sternal plate of the thorax complete (Figs. 37-39, 113-115).  

**Nycteribia**, subgenus **Nycteribia** (p. 55)

Tibiae more slender, 3.5 times as long as wide. Only 3 tergites on the female abdomen. Head sclerotized up to the anterior dorsal margin. Row of setae at the posterior margin of the sternal plate of the thorax with a small gap in the middle (Figs. 172-175).  

**Nycteribia**, subgenus **Acrocholidia** (p. 112)
5. Large, very hairy, broadly built insects. Oblique sutures of the sternal plate of the thorax fused. Numerous notopleural setae in several rows. Haltere groove incompletely closed. Tergal and sternal plate 1 of the female abdomen covering the greater part of the abdomen. Abdominal ctenidium either absent or consisting only of a few spines (Figs. 567-577). **Stereomyia** (p. 338)  
 Oblique sutures not fused. Only a single row of notopleural setae. Haltere groove open. Abdominal ctenidium well developed in both sexes. Basal sclerites of the female much smaller. 6
6. Row of hairs at the posterior margin of the sternal plate of the thorax complete. Tergal plate 2 of the female abdomen with 2 posterior processes with long setae or spines. Genital plate consisting of a group of setae on a field of minute hairs. Parameres free.  

**Basilina**, subgenus **Tripselia** (p. 300)

Row of setae at the posterior margin of the sternal plate of the thorax reduced to a group of 3-6 setae or to a single seta at each side. Tergal plate 2 of the female abdomen with straight or rounded posterior margin. Parameres partly or completely fused with the phallobase. Genital plate shield-shaped or forming a lip covering the genital opening from above (Figs. 178-183).  

**Stylidia** (p. 116)
7. Eyes consisting of a single unpigmented lens (except in one species with 4 lenses in 2 elliptical frames). 8  
 Eyes pigmented, with 2 lenses which are more or less clearly separated (except in 2 species of *Basilina* with reduced eyes). 11
8. Medium sized or large, setose insects (2.5-5 mm.). Mesonotum narrowing posteriorly. Haltere groove closed by a cover. Post-spiracular sclerite absent. Oblique sutures of the sternal plate of the thorax fused. Tibiae with several rows of setae distally. Spines of thoracic ctenidium slender, pointed. Abdominal ctenidium either well developed, reduced or absent. 9  
 Small or medium sized insects (1.75-3 mm.). Haltere groove open. Post-spiracular sclerite present. Mesonotum widening posteriorly or elliptical. Oblique sutures fused or open. Spines of thoracic and abdominal ctenidium thick and blunt. Tibiae cylindrical with short setae in the middle. 10
9. Thoracic ctenidium present. Abdominal ctenidium either well developed, reduced in both sexes or absent in the female. Eyes well developed as a single lens.  

**Penicillidia**, subgenus **Penicillidia** (p. 358)

## NYCTERIBIIDAE

Thoracic and abdominal ctenidium absent in both sexes. Eyes reduced.

**Penicillidia**, subgenus **Eremoctenia** (p. 397)

10. Ventral margin of the head undivided. Oblique sutures open, forming an angle of about 90°. Fore-coxae long, conical. Tibiae with 2 rings and short setae in the middle. Basitarsi long. Abdominal ctenidium present. Male genitalia with a connecting tube partly covered with spines between aedeagus and phallobase and with an endophallus (Figs. 705-716).

**Eucampsipoda** (p. 410)

Ventral margin of the head divided by an incision with setae at its posterior margin. Oblique sutures of the sternal plate of the thorax fused, joining the median suture at right angles, both halves forming a straight line. Tibiae with 3 well-marked rings and 3 rows of short setae near them in the distal half. Fore-coxae short, triangular. Basitarsi very short, not longer than the 3 tarsi together. Abdominal ctenidium absent. Genitalia of *Nycteribia* type, with rudimentary endophallus in one species. Eyes consisting of a single unpigmented lens in one species and with 4 lenses in two elliptical frames in another (Figs. 682-704).

**Archinycteribia** (p. 401)

11. Eyes with two incompletely separated lenses on a common pigmented base. Tibia scalpel-shaped, with 3 or 4 rows of setae. Thorax of *Nycteribia* type. A row of 7-15 notopleural setae. Male genitalia of *Nycteribia* type. (In two species the eyes are reduced to single lens.) 12

Eyes with well-separated lenses on a more or less deeply divided pigmented base. Tibiae cylindrical, with well marked rings and short setae in the middle. Mesonotum widening posteriorly. 1-4 notopleural setae in most species. (Absent in one species, a group of 7-8 setae in another.) 14

12. Tibia 2 conical, with 2-3 rows of spines near the base. Basitarsi very short. Tibia 1 and 3 of normal shape, with 3 rows of setae distally. Tergite 2 of female abdomen very short. Two elliptical sclerites between tergite 2 and 6 (Figs. 484-492).

**Basilina**, subgenus **Conotibia** (p. 284)

All 3 tibiae of equal shape, with 3 or 4 rows of setae distally or in the middle. Basitarsi longer. 13

13. Tergite 1 of the female abdomen short, tergal plate 2 either with two posterior processes, bearing long setae (*bathybothyra* group) or with straight or concave or rounded posterior margin. 3 or 4 rows of setae on the tibiae in the distal half, reaching beyond the tip.

**Basilina**, subgenus **Basilina** (p. 199)

Tergal and sternal plates 1 of the female abdomen very long, covering half or two-thirds of the abdomen. Tibiae slender, with 3 rows of setae in the middle which do not reach beyond the tip of the tibiae (Figs. 493-509).

**Basilina**, subgenus **Paracyclopodia** (p. 290)

14. Tibiae with 2 rings. Head moderately compressed laterally. Palps broad at the base, slender apically. Eyes with large lenses on a broad, but shallow pigmented base (Figs. 761-779).

**Dipseliopoda** (p. 428)

Tibiae with 3 rings. Head flattened dorsoventrally. 15

15. Eyes with two well-developed lenses, each on a nearly separate, pigmented base. Palps flattened with short terminal seta. Sclerite connecting the thoracic ctenidium with coxa 2 triangular, with several rows of short hairs. Tergites 5 and 6 of the male abdomen shorter than tergites 3 and 4. Sternite 5 of the male with an armature of spines. Anal segment broad, conical. Segmentation of the female abdomen much reduced, no sclerites between the basal sclerites and the anal segment, except sternite 7 which is transformed into a genital plate with spines posteriorly. Aedeagus membranous, with a sclerotized rod in its wall, without apodeme (Figs. 780-800).

**Cyclopodia**, subgenus **Cyclopodia** (p. 442)

Eyes with lenses less well separated. Palps broad at the base, slender apically, with a long terminal seta. Sclerite connecting the thoracic ctenidium with coxa 2 strip-like, with a single row of short hairs. Tergite 5 of the male abdomen longer than, or as long as, tergite 4. Sternite 5 without an armature of spines. Anal segment very long and slender, nearly cylindrical in some species, nearly twice as long as wide at the base or longer. Aedeagus partly or wholly sclerotized and with an apodeme. Abdomen of female with a tergite 6 and either sternites 5 and 6 or with only sternite 6 present. Sternite 7 not transformed into a genital plate (Figs. 855-876).

**Cyclopodia**, subgenus **Leptocyclopodia** (p. 476)



## SUBFAMILY NYCTERIBIINAE

Head laterally compressed or broadly rounded. Eyes present or absent. Mesonotum parallel-sided or narrowing posteriorly (exception *Hershkovitzia*). Notopleural setae generally in a row of 6–15 setae, absent in some species of *Penicillidia*, reduced in number in other species of *Penicillidia* and in *Hershkovitzia*. Mesopleural sutures originating halfway between the thoracic spiracles. Tibiae laterally compressed, with several rows of setae at the ventral margin, those of the distal rows long in most cases. Abdomen of the female generally with 3 or 4 tergites before the anal segment. Only 2 tergites before the anal segment in some species of *Penicillidia* and most American species of *Basilia*, 7 tergites and sternites in *Hershkovitzia*. Tergites 1 and 2 generally separate, fused only in the males of some species of *Penicillidia* and in both sexes of *Hershkovitzia*. One or two genital plates present in most species, absent in a few. Male genitalia of *Nycteribia* type, with sclerotized aedeagus and apodeme. Setae and spines fine, spines of ctenidia narrow and pointed.

Parasites of Microchiroptera. Distributed both in the Old and New World.

## GENUS NYCTERIBIA Latreille, 1796

*Nycteribia* Latreille, 1796, *Préc. caract. gener. insectes*, p. 176. Type species: *Nycteribia pedicularia* Latreille, 1805.

*Diagnosis.* Small or medium-sized species with laterally compressed head. Eyes absent. Palps with two marginal rows of setae ventrally and a long terminal seta. Labella of the proboscis longer or shorter than the theca. Notopleural sutures with broad lateral plates which bear a row of 6–15 notopleural setae. Thoracic ctenidium with pointed spines. Tibiae flattened without marked rings and with several rows of ventral setae in the distal part. Haltere groove without cover. Male abdomen with normal segmentation, 3 or 4 tergites on the female abdomen anterior to the anal segment. Post-spiracular sclerite narrow, with several setae. Abdominal ctenidium consisting of closely placed, specialized spines. Genitalia of *Nycteribia* type. Two genital plates present in the female of which the dorsal one bears spines, or only a dorsal plate, or both lacking.

## SUBGENUS NYCTERIBIA Latreille, 1796

*Listropoda* Kolenati, 1857, *Wien. Ent. Monatsschr.* 1, 61

Head partly membranous in the anterior dorsal part. Tibiae short and broad, laterally compressed, with 3 rows of long setae in the distal part of the ventral edge. Either two genital plates present, a dorsal plate only, or none.

The subgenus can be divided into 3 groups:

1. The *pedicularia* group with 3 tergites before the anal segment on the female abdomen and with 2 genital plates. Palaearctic and Oriental Region. 11 species.
2. The *schmidlii* group with 4 tergites on the female abdomen before the anal segment and only a dorsal genital plate. Claspers of the male without basal angle. Ethiopian Region, one species extending into the Mediterranean. 5 species.
3. The *parilis* group with 4 tergites on the female abdomen before the anal segment, a very short second tergite, sternites 7 and 8 fused. No genital plates. Claspers of the male with a marked angle near the base. Oriental and Pacific Regions. 6 species.



SUBGENUS **ACROCHOLIDIA** Kolenati, 1857*Acrocholidia* Kolenati, 1857, *Wien. Ent. Monatsschr.* 1, 61

Head sclerotized up to the anterior dorsal margin. Tibiae slender, 3.5 times as long as wide. Only a dorsal genital plate with spines or setae. Palearctic Region. Only two closely related species.

KEY TO THE SPECIES OF *NYCTERIBIA*

## FEMALES

- |     |   |                                 |    |
|-----|---|---------------------------------|----|
| 1   | Fore tibia 2-2.5 times as long as wide.   | (Subgenus <b>Nycteribia</b> )   | 2  |
|     | For tibia 3.5 times as long as wide.  | (Subgenus <b>Acrocholidia</b> ) | 22 |
| 2.  | 3 tergites before the anal segment on the abdomen.  | ( <b>pedicularia</b> group)     | 3  |
|     | 4 tergites before the anal segment on the abdomen.  |                                 | 12 |
| 3.  | Lateral sclerites of sternite 5 widely separated, with 4-10 setae between them.   |                                 | 4  |
|     | Lateral sclerites of sternite 5 either reaching the midline, or with 1-2 setae between the sclerites in some specimens.   |                                 | 7  |
| 4.  | Length 2 mm. Anal segment narrow, parallel sided, sharply set off from the abdomen. Tergite 6 with only spines at the posterior margin and 4-6 long setae on the surface. Oriental Region.  |                                 | 5  |
|     | Anal segment conical, as wide at its base as the end of the abdomen.  |                                 | 6  |
| 5.  | Genital plate broadly elliptical, with a double row of long and short spines (Figs. 64-70).   | <b>N. allotopa</b> (p. 55)      |    |
|     | Genital plate triangular, with 6-8 spines only (Figs. 71, 72, 79).  | <b>N. allotopoides</b> (p. 60)  |    |
| 6.  | Length 3 mm. Tergite 2 of abdomen about as long or longer than the width of tergite 1, strongly convex posteriorly. Dorsal genital plate triangular with truncated sides and 11-15 strong spines. Ventral genital plate wide (Figs. 94-96).   | <b>N. latreillii</b> (p. 69)    |    |
|     | Length 2.2 mm. Tergite 2 similar to that of <i>N. latreillii</i> or pointed posteriorly. Dorsal genital plate triangular, with 8-10 long setae. Ventral genital plate narrow (Fig. 91).   | <b>N. kolenatii</b> (p. 67)     |    |
|     | Length 2.5 mm. Tergite 2 shorter in the middle than the width of tergite 1. Dorsal genital plate triangular with a row of about 12 short spines. Ventral genital plate narrow (Figs. 37, 38, 48).   | <b>N. pedicularia</b> (p. 78)   |    |
| 7.  | Moderately long, thin setae at the posterior margin of tergite 1.   |                                 | 8  |
|     | Only very short or minute hairs at the posterior margin of tergite 1.   |                                 | 10 |
| 8.  | Small insects, 1.5-1.75 mm. Several rows of setae at the posterior margin of tergite 1. Tergite 2 very short, its length, in the middle, half the width of tergite 1. Several spines on the surface of tergite 6. Anal segment very short, wider than long.   |                                 | 9  |
|     | Larger insect, 2-2.5 mm. Only a single row of setae at the posterior margin of tergite 1. Tergite 2 as long in the middle as the width of tergite 1. 15-20 long, closely placed setae in the middle of the posterior margin of tergite 2. Anal segment very long, as long as tibia 1. Dorsal genital plate reduced to a group of 5-6 setae (Figs. 87-88). | <b>N. japonica</b> (p. 65)      |    |
| 9.  | Dorsal genital plate concave posteriorly, with 2 setae (Figs. 101-104).   | <b>N. parvula</b> (p. 73)       |    |
|     | Dorsal genital plate not concave posteriorly (Figs. 105, 112).  | <b>N. parvuloides</b> (p. 77)   |    |
| 10. | Tergite 2 shorter in the middle than the width of tergite 1. 18 long setae in the middle of the posterior margin. Tergite 6 with only spines at the posterior margin and 4-6 long premarginal setae. Anal segment small. Dorsal genital plate large, rectangular, with about 15 spines posteriorly. Ventral plate absent. Himalayas (Fig. 82).            | <b>N. dentata</b> (p. 61)       |    |

- Tergite 2 similar, broadly rounded, with about 20 shorter setae at the posterior margin, the setae distributed over its whole width. 11
11. One or 2 rows of long setae on the pleurae laterally and posteriorly to tergite 6. Dorsal genital plate triangular, with 6–8 spines. Ventral genital plate triangular. Malaya (Figs. 116–117). **N. triangularis** (p. 81)
- No long setae laterally and posteriorly to tergite 6, but only very short spines. Dorsal genital plate elliptical, with a row of 9–15 spines which form an obtuse angle. Ventral plate absent. East Asia (Figs. 83–84). **N. formosana** (p. 62)
12. An elliptical or triangular genital plate with 6–12 short spines present, which is separate from sternite 7. Ethiopian Region. (**schmidlii** group) 13
- Genital plate absent. Sternite 8 partly or completely fused with sternite 7, forming a more or less triangular sclerite. Oriental and Pacific Region. (**parilis** group) 17
13. Abdominal tergites not covering the whole abdomen. Membranous area of the dorsum between the tergites covered with short spines. 14
- Abdominal tergites covering the whole abdomen, without any spines between them. 16
14. Short spines between tergite 2 and 3 and between tergite 3 and 4. Tergite 2 very short. Tergite 3 also very short and bare on the surface. Anal segment very narrow, parallel sided, sharply set off from the abdomen. Sternite 7 divided into lateral sclerites. Genital plate large, semi-circular, with long or short setae posteriorly, reaching to about half the length of the anal segment. Madagascar (Figs. 142–144). **N. stylidiopsis** (p. 96)
- No short spines between tergite 2 and 3. Anal segment broad, nearly as wide at the base as the abdomen. 15
15. Tergite 3 about three-quarters as wide as tergite 2, surface covered with short spines. Genital plate elliptical with a row of very short spines posteriorly (Figs. 133–134). **N. schmidlii** (p. 90)
- Similar, but tergite 3 only half as wide as tergite 2. Genital plate with more strongly sclerotized anterior margin and 6–8 strong, short spines at the posterior margin (Fig. 124). **N. exacuta** (p. 86)
16. Length 2–2.3 mm. Tergite 1 with 3–4 rows of moderately long setae posteriorly. Tergal plate 2 very long, covering about half the abdomen, with a small group of short hairs in the middle of the surface. Tergal plate 3 with 6 long setae posteriorly, tergal plate 4 with only 2 long setae. Surface of both these tergal plates bare (Figs. 128, 130). **N. latiterga** (p. 88)
- Length 2.5 mm. Tergite 1 with only very short hairs posteriorly. Tergal plate 2 short, surface bare. Tergal plate 3 with 10–12 long setae posteriorly, tergal plate 4 with 8–11 long setae at the posterior margin. A small group of short hairs on the surface of tergal plate 3, tergal plate 4 bare (Figs. 120–121). **N. capensis** (p. 83)
17. Tergite 2 with a marginal row consisting only of thick spines alternating with minute spines. No setae in the row (Figs. 169, 170). **N. spinosa** (p. 110)
- Marginal row of tergite 2 consisting of setae and spines. 18
18. Marginal row of tergite 2 consisting of short setae laterally and only spines in the middle. Surface of tergite 2 nearly bare. Lateral sclerites of the anal segment each with a transverse row of 4–6 spines across the middle. Sternites 7–8 with 2 setae at the apex and a group of 3 setae and 1 spine further basally (Figs. 166, 167). **N. sarasini** (p. 108)
- Marginal row of tergite 2 consisting of setae in its whole length, alternating with more or less minute spines. 19
19. Marginal row of tergite 2 consisting of setae only except for 2–3 minute spines in the middle. Sternites 7–8 broadly rounded posteriorly. 20
- Marginal row of tergite 2 consisting of setae alternating with spines in the greater part of the hind margin. Sternites 7–8 triangular, with 2 setae at the apex which is separated from sternite 7 by a membrane. 21
20. About 50 short setae between tergites 2 and 3. Tergites 3 and 4 very wide, nearly reaching across the whole width of the abdomen. Tergite 3 with about 10 short horizontal setae. Tergite 4

with 8 long vertical setae. Lateral sclerites of the anal segment with a row of 3-5 spines along their posterior inner margins, forming a shallow angle. Sternite 1 + 2 with short setae only on the surface. Sternites 7-8 broadly rounded, with a double marginal row (Figs. 160, 161).

**N. papuensis** (p. 105)

Only about 20 setae between tergites 2 and 3. Tergites 3 and 4 narrow, covering only about half the width of the abdomen. Tergite 3 with 2 long setae in the middle and 2-3 shorter setae laterally. Tergite 4 not wider than 3, but longer, with only 4 long setae. Anal segment with only 2 groups of 2 spines dorsally. Sternite 1 + 2 with 2 long setae in the posterior row of the surface. Sternites 7-8 with a marginal row which is double in the middle and single laterally (Figs. 163, 164).

**N. rothschildi** (p. 107)

21. Sternite 1 + 2 with only short setae on the surface. Anal segment with a row of about 5 spines along the posterior border of each sclerite, forming an angle with the apex anteriorly (Figs. 148, 149).

**N. parilis** (p. 99)

Sternite 1 + 2 with 2-4 long setae in the posterior row of the surface. Anal segment with 2 groups of 6-9 spines in 2-3 rows in the middle of the sclerites (Figs. 157, 158).

**N. bakeri** (p. 103)

22. Genital plate consisting of a strongly sclerotized arc with about 4 short spines. Tergite 1 with a row of long setae posteriorly (Fig. 173).

**N. (A.) vexata** (p. 112)

Tergite 1 with a row of short setae posteriorly. Genital plate not concave posteriorly, with 5-6 moderately long setae.

**N. (A.) lindbergi** (p. 115)

MALES

1. Fore tibia 2-2.5 times as long as wide. (Subgenus **Nycteribia**) 2  
Fore tibia 3.5 times as long as wide. (Subgenus **Acrocholidia**) 22
2. Claspers straight or slightly curved. 3  
Claspers with a pronounced basal angle. (**parilis** group) 17
3. Length 1.5-1.75 mm. Tergite 1 with several rows of setae posteriorly. Sternite 5 with only thin setae, but no spines at the posterior margin. Anal segment very short. Claspers very short, pointed. 4  
A row of spines at the posterior margin of sternite 5 present. 5
4. Aedeagus slender, tapering, slightly curved, with rounded tip. Parameres slender, slightly curved, tapering gradually to a blunt end. About 6 minute hairs with oblique bases along the dorsal edge (Figs. 106-110). **N. parvula** (p. 73)  
Aedeagus shorter, with a thick base, and a downwardly pointing sharp tip. Parameres triangular, with pointed end and minute hairs with vertical bases at the dorsal edge (Fig. 111). **N. parvuloides** (p. 77)
5. Sternite 5 either strongly convex posteriorly, with a double row of short spines or slightly curved with a median process which bears spines. (**schmidlii** group) 6  
Sternite 5 with the posterior margin straight or concave. (**pedicularia** group) 9
6. Sternite 5 long, strongly convex posteriorly, with a double row of 14-16 short, thick spines. Anal segment very long, nearly parallel-sided. Tergite 6 very narrow, strip-like, with short marginal setae, nearly completely covered by tergite 5. Aedeagus with long bifid tip which is curved backwards and with scales at the base of the dorsal membrane (Figs. 135-138). **N. schmidlii** (p. 90)  
Sternite 5 short, with slightly convex posterior margin and a median process. 7
7. Tergite 6 strip-like as in *N. schmidlii*. Posterior margin of sternite 5 with a median process which bears 6-8 spines. Aedeagus tapering to a long single point which is curved backwards (Figs. 125-127). **N. exacuta** (p. 86)  
Tergite 6 normal, with a marginal row like that of tergite 5. Posterior margin of sternite 5 with a median process which bears 8-12 spines of different size. Aedeagus with upturned tip. 8



8. Length 2.5 mm. Tergites 2-6 completely bare on the surface. Aedeagus tapering to a sharp point which is turned up at a right angle (Figs. 122, 123). **N. capensis** (p. 83)  
Length 2-2.3 mm. Tergites 1-5 covered with fine hairs, tergite 6 bare. Aedeagus with a dorsal bulge and less strongly curved (Figs. 129, 131, 132). **N. latiterga** (p. 88)
9. Aedeagus with a ventral tooth. 10  
Aedeagus lacking a ventral tooth. 11
10. Length 3 mm. Tergite 4 with a group of hairs on the surface. Sternite 5 with a row of 14-18 spines in the middle of the posterior margin. Phallobase conical, aedeagus conical with a ventral tooth near the tip (Figs. 35, 36, 97, 98). **N. latreillii** (p. 69)  
Length 2.5 mm. Tergite 4 bare or with a few hairs. Sternite 5 with a row of 9-12 short spines in the middle of the posterior margin. Phallobase with a marked dorsal bulge. Aedeagus wide and short, with a rounded end and a ventral tooth at about the distal third (Figs. 113-115). **N. pedicularia** (p. 78)  
Length 2-2.25 mm. Tergite 4 as in *N. pedicularia*. Sternite 5 with a row of 7-8 spines in the middle of the posterior margin. Phallobase conical, without dorsal bulge. Aedeagus slender, with a ventral tooth at the distal fifth (Figs. 92, 93). **N. kolenatii** (p. 67)
11. Tergite 4 with some hairs on the surface. Sternite 5 with 10-12 spines in the middle of the posterior margin. Aedeagus as wide at the apex as at the base. Parameres triangular, with a sharp distal point and a curved ventral edge (Figs. 118, 119). **N. triangularis** (p. 87)  
Aedeagus tapering towards the tip. 12
12. Aedeagus slightly curved, ending in a sharp point. 13  
Aedeagus ending in a rounded tip. 14
13. Sternite 5 with 8-11 spines in groups of two between setae. Parameres slender, triangular, two-thirds the length of the aedeagus. Phallobase conical. East Asia (Figs. 89, 90). **N. japonica** (p. 65)  
Sternite 5 with a group of 4-6 spines. Parameres triangular, very short, about one-third of the length of the aedeagus. Phallobase with 2 long, rounded processes distally. Madagascar (Figs. 145-147). **N. styliidiopsis** (p. 96)
14. Aedeagus nearly straight, swollen at the base. Parameres with a dorsal bulge, with a curved distal process and 1-2 hairs at its base. East Asia (Figs. 85, 86). **N. formosana** (p. 62)  
Aedeagus slender, curved, parameres different 15
15. Tergite 4 bare on the surface. Sternite 5 with a marked concavity in the middle of the posterior margin and a row of 12-14 short spines along the sides of the concavity. Aedeagus strongly curved, turned up at right angles or nearly so. Parameres with a long apical process and a sharp ventral process, with a deep concavity between them. Himalayas (Figs. 80, 81). **N. dentata** (p. 61)  
Tergite 4 with hairs on the surface. Sternite 5 without median concavity at the posterior margin and with only 4-5 spines in the middle of it. Aedeagus slightly curved. Parameres slender without ventral tooth. 16
16. Anal segment very long, longer than tergites 5 and 6 together. Aedeagus curved, parameres with a blunt end and with a longer and a shorter hair (Figs. 73-77). **N. allotopa** (p. 55)  
Aedeagus nearly straight, with a narrower tip and a dorsal bulge. Parameres also more pointed than in *N. allotopa* and with one hair at the tip and another more basally (Fig. 78). **N. allotopoides** (p. 60)
17. Apical part of the claspers long, thin and curved. 18  
Apical part of the claspers short, thick and straight. 20
18. Length 1.5-1.75 mm. Only 5-12 short setae on the surface of tergites 2-4. Sternite 1 + 2 with a ctenidium of 30 spines. Two setae of the posterior row of the surface longer than the others, reaching beyond the ctenidium. Claspers short, 0.24 mm. long. Aedeagus 0.16 mm. long, slender, slightly curved upwards. Parameres slender, phallobase joining the parameres at the apical third (Figs. 156, 165). **N. rothschildi** (p. 107)

Length 1.75–2 mm. Setae on the surface of tergites 2–4 more numerous. Setae of the posterior row of the surface of sternite 1 + 2 of equal length, not reaching beyond the ctenidium. Claspers and aedeagus longer.

19

19. Tergite 1 with a double marginal row. Abdominal ctenidium with 35 spines. Anal segment as long as wide at the base dorsally or longer. Claspers 0.35 mm. long. Parameres with markedly curved ventral side. Phallobase joining the paramere close to the tip. Aedeagus 0.2 mm. long, straight, with sharp, downwardly pointing tip (Figs. 150, 151). **N. parilis** (p. 99)

Tergite 1 with a single marginal row. Abdominal ctenidium with 40 spines. Anal segment dorsally markedly wider at the base than long. Parameres with less curved ventral side. Phallobase joining the paramere at the apical quarter (Figs. 154, 162). **N. papuensis** (p. 105)

20. A group of 2–4 thick spines in the middle of the posterior margin of sternite 5. Aedeagus curved upwards. Claspers short, thickened apically (Figs. 155, 171). **N. spinosa** (p. 110)

Spines lacking, only setae at the posterior margin of sternite 5. Claspers cylindrical.

21

21. Sternite 1 + 2 with only short setae on the surface. Aedeagus curved downwards (Figs. 152, 168). **N. sarasini** (p. 108)

Sternite 1 + 2 with 2–4 long setae in the posterior row of the surface. Aedeagus straight (Figs. 153, 159). **N. bakeri** (p. 103)

22. Tergites 5 and 6 with bare surface. Aedeagus with rounded end which is as wide as the base, narrower in the middle. Parameres slender, triangular, three-quarters the length of the aedeagus (Figs. 174, 175). **N. (A.) vexata** (p. 112)

Tergites 5 and 6 with short hairs on the surface. Aedeagus very narrow apically. Basal part of the aedeagus swollen, 4 times as thick as the tip. Parameres shorter, only two-thirds the length of the aedeagus (Figs. 176, 177). **N. (A.) lindbergi** (p. 115)

#### SUBGENUS NYCTERIBIA Latreille, 1796

##### PEDICULARIA GROUP

##### Nycteribia allotopa Speiser, 1901

(Figs. 64–70, 73–77)

*Nycteribia allotopa*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia insolita*. Scott, 1908, *Trans. Ent. Soc. London*, **1908**, 359.

*Nycteribia allotopa* Speiser. Scott, 1913, *Arch. Naturgesch.* **79**, 92.

*Nycteribia allotopa* Speiser. Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, ser. 8, 209.

*Nycteribia allotopa* Speiser. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Nycteribia allotopa* Speiser. Ferris, 1924, *Phil. Jour. Science*, **25**, 391.

*Nycteribia allotopa* Speiser. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31

*Nycteribia allotopa* Speiser. Theodor, 1954, in Lindner, *Die Fliegen der Palaearktischen Region*,

*Nycteribiidae*, **66a**, 15.

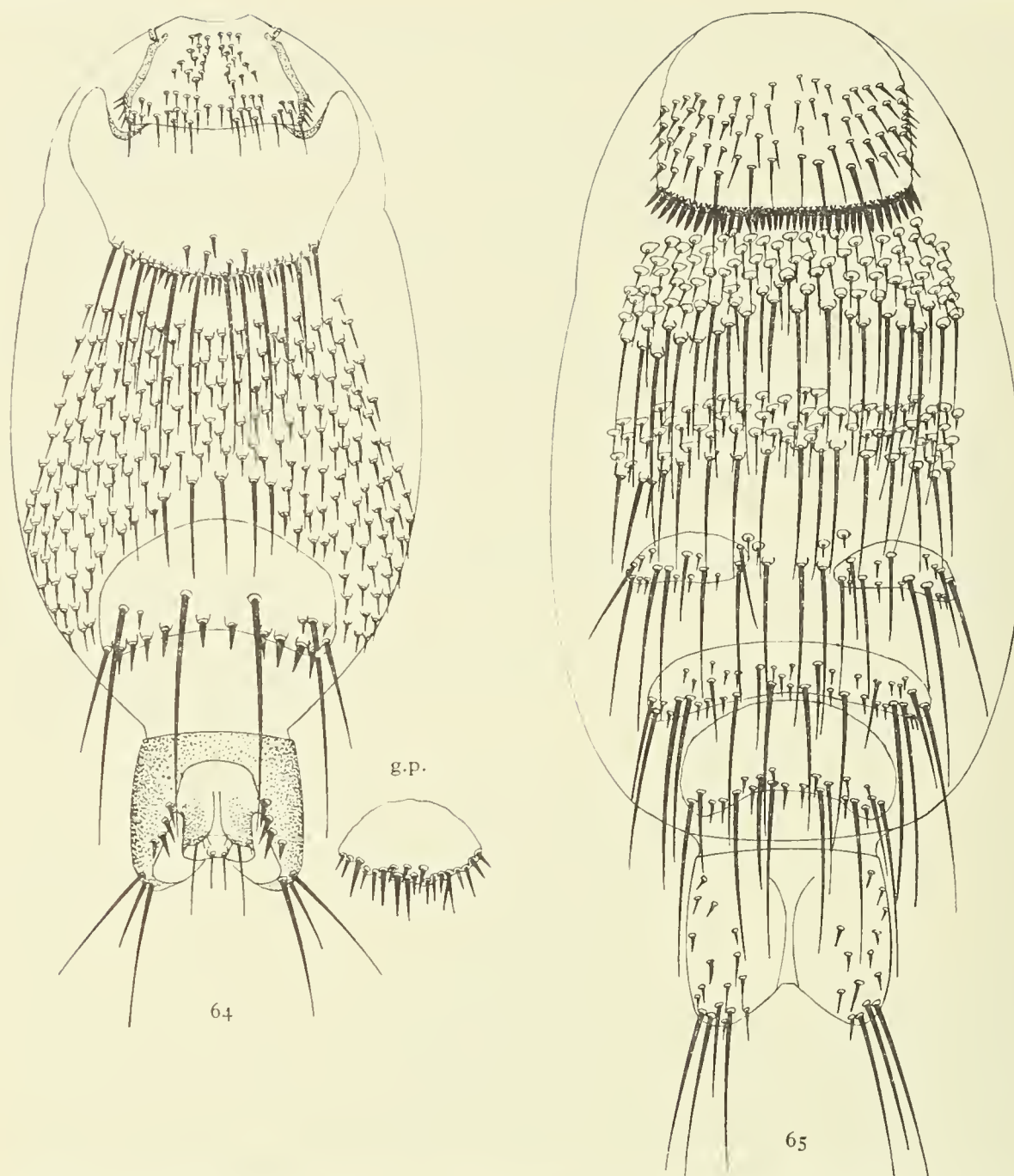
*Nycteribia allotopa* Speiser. Hiregaudar & Bal, 1956, *Agra Univ. Jour. Res. (Science)*, **5**, 1

*Nycteribia allotopa* Speiser. Theodor, 1963, *Fieldiana, Zoology*, **42**, 151.

Description. Length 2.5 mm. Colour yellowish brown. 9–10 notopleural setae of which the anterior ones are much shorter.

*Male abdomen*. Tergites 1–4 with short hairs on the surface which are longer and less numerous on tergites 3 and 4. The marginal rows of tergites 3 and 4 consist of moderately long, thin and short setae. The marginal rows of tergites 4–6 consist of much longer setae alternating with groups of 2–3 spines. Anal segment long, cylindrical in its apical two-thirds and widening at the base. It is longer than tergites 5 and 6 together. Sternite 5 with a marginal row of long setae and 4–5 spines in the middle of the hind margin. Claspers thin, curved, with pigmented tips. Aedeagus



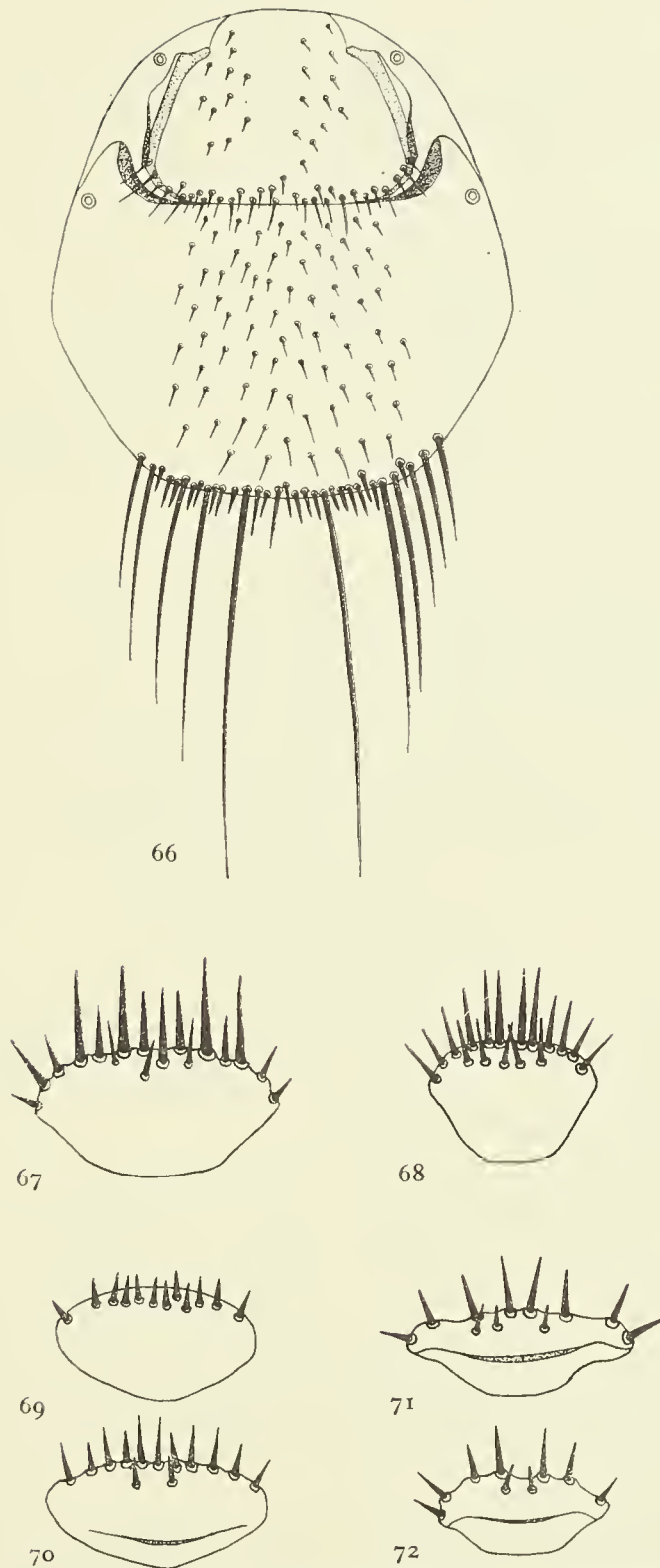


Figs. 64, 65. *Nycteribia allotopa* Speiser. Female abdomen. 64. dorsal, with genital plate; 65. ventral.

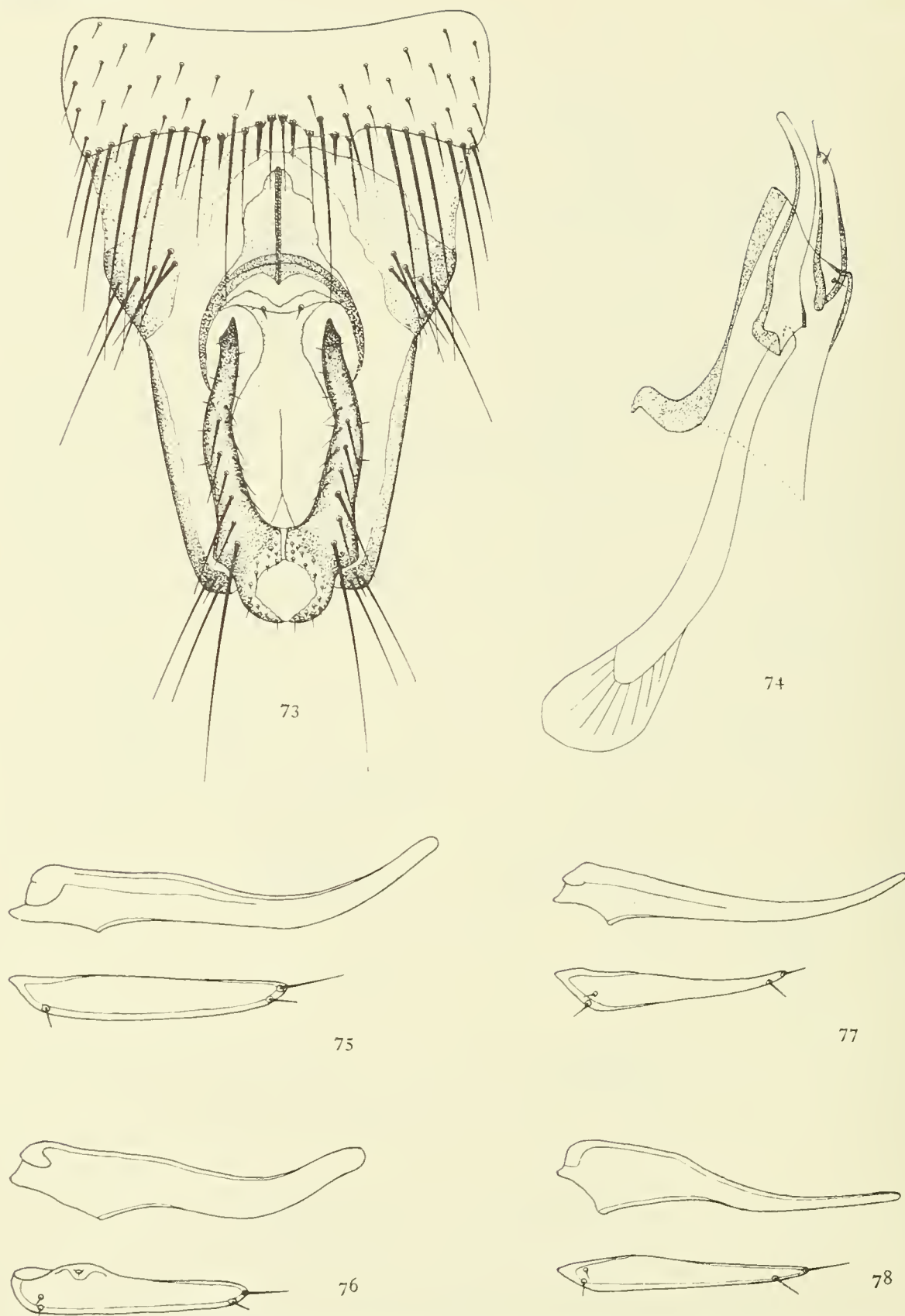
shorter, curved, tapering to a blunt point. Parameres with a blunt end which carries a longer and a shorter hair.

*Female abdomen.* Tergite 1 with several rows of short setae near the hind margin. Tergite 2 pentagonal, with about 12 long setae alternating with short spines at the hind margin. In most specimens the surface of the tergite is bare, except for a few short hairs near the hind margin. In about a quarter of the specimens the surface of the tergite is covered with 70–80 short hairs up to the anterior margin, leaving a lateral strip bare. Tergite 6 broad, with a curved anterior margin and 4 long vertical setae on the surface and 2 shorter setae laterally at the posterior corners. Only short spines at the posterior margin and a few scattered on the surface. The





Figs. 66-72. 66-70. *Nycteribia allotopea* Speiser. 66. female abdominal tergite 2 with hairs; genital plate of specimen from: 67. Formosa; 68. Philippines; 69. Ceylon; 70. Bombay; 71, 72. of *N. allotopoides*.



Figs. 73-78. 73-77. *Nycteribia allotopa* Speiser. Male. 73. sternite 5 and genital area; 74. genitalia of specimen from Formosa; aedeagus and paramere of specimen from: 75. Formosa; 76. Philippines; 77. Ceylon; 78. of *N. allotopoides*.

short spines on the connexivum between tergites 2 and 6 reach to the posterior margin of tergite 6 and there is a row of longer setae in front of tergite 6. Anal segment much narrower than the abdomen, sharply set off from it, parallel sided, with a deep incision posteriorly on the ventral side and a longitudinal oblique row of short spines on each half of the dorsal surface. Dorsal genital plate transversely elliptical with a double row of spines at the posterior margin which are mostly shorter than the plate. Ventral plate absent. Abdominal ctenidium with 35-40 spines which are shorter in the middle.

The above is the description of the material from Formosa. This is treated generally as typical, mainly because of the large number of specimens available in collections, due to the collecting of Sauter in 1906. The specimens from Burma resemble the Formosan specimens closely. No material from the type locality was available.

*Philippine form.* The specimens differ from the Formosan specimens in the male mainly in the aedeagus being shorter and thicker at the tip and the parameres also being shorter. In the female, the genital plate is of more triangular form, less wide and some of the spines at the hind margin are longer than in the Formosa material, nearly as long as the plate itself.

*Ceylon and Bombay form.* In this form the aedeagus is shorter than in the Formosan specimens and its end is much thinner. The parameres are also shorter and taper to a much thinner tip than in the Formosan specimens. The genital plate of the female is transversely elliptical and bears only a single row of about 12 short spines at the hind margin, with 1-2 premarginal spines in some specimens. This form will probably prove a subspecies.

Distribution: Sumatra (Type locality), Ceylon, India, Burma, Japan, Formosa, Philippines.

Type series in the Genoa Natural History Museum.

MATERIAL IN THE COLLECTION

INDIA

Helwak, near Bombay, from *Miniopterus* sp., 30.v. 1900, 1 ♂ (Brit. Mus. 1908.230).  
Satara district, Bombay, from *Miniopterus schreibersi*, 13-16.iv. 1912, F. G. H. (ex coll. Indian Museum), 4 ♂ 4 ♀.

CEYLON

Peradeniya, from *Miniopterus schreibersi*, Oct. 1911, 30.i. 1912, J. C. F. Fryer, 3 ♂ 6 ♀.  
Dammara, Passara, Uva, from *Miniopterus schreibersi fuliginosus*, 15.v. 1922, W. W. A. Phillips, 6 ♂ 4 ♀.  
Mousakande, Gammaduwa, from *Miniopterus schreibersi fuliginosus*, 5.iv. 1925, 10.ii. 1926, 13.ii. 1933, W. W. A. Phillips, 7 ♂ 9 ♀ (Brit. Mus. 1933.262).  
Kosgalla, Namunukula, Uva Hills, from *Miniopterus schreibersi fuliginosus*, 7.viii. 1955, W. W. A. Phillips, 1 ♂ 2 ♀.

BURMA

Mandalay and Fort Ava near Mandalay, from *Miniopterus* sp., 22.xi. 1937, G. Heinrich, 1 ♂ 2 ♀ (Brit. Mus. 1946.288-289).

MOLUCCAS

Amboina, from *Miniopterus schreibersi*, 1908, F. Muir, 1 ♂.

PHILIPPINES

Tablas Island, from *Miniopterus schreibersi eschscholtzii*, Jan. 1923, E. H. Taylor, N. C. Rothschild, 1 ♂ 1 ♀.

CHINA

Amoy, from *Miniopterus schreibersi blepotis*, quoted by Scott, 1913.

JAPAN

Kyushu, Miyazaki Ken, Tano, from bat no. 495, 2.iii. 1905, M. P. Anderson, 1 ♀.  
Loo Choo Islands, from *Crocidura caerulea*, 19.v. 1902, N. C. Rothschild, 1 ♂ (straggler).

FORMOSA

Tainan, from *Miniopterus schreibersi*, Oct. 1906, H. Sauter, type series of *N. insolita* Scott and 45 ♂ ♀ (Brit. Mus. 1913.489 and 1922.313).

HOST SYNONYMY

Name on original label

*Miniopterus eschscholtzii* Waterhouse.  
*Miniopterus fuliginosus* Hodgson.

Current name

*M. schreibersi eschscholtzii* Waterhouse.  
*M. schreibersi fuliginosus* Hodgson.



**Nycteribia allotopoides** Theodor, 1963

(Figs. 78, 79)

*Nycteribia allotopoides*. Theodor, 1963, *Feldiana, Zoology*, **42**, 151.

The specimens are slightly smaller and more lightly coloured than specimens of *N. allotopa* from the same locality. This species resembles *N. allotopa* in most characters except for the

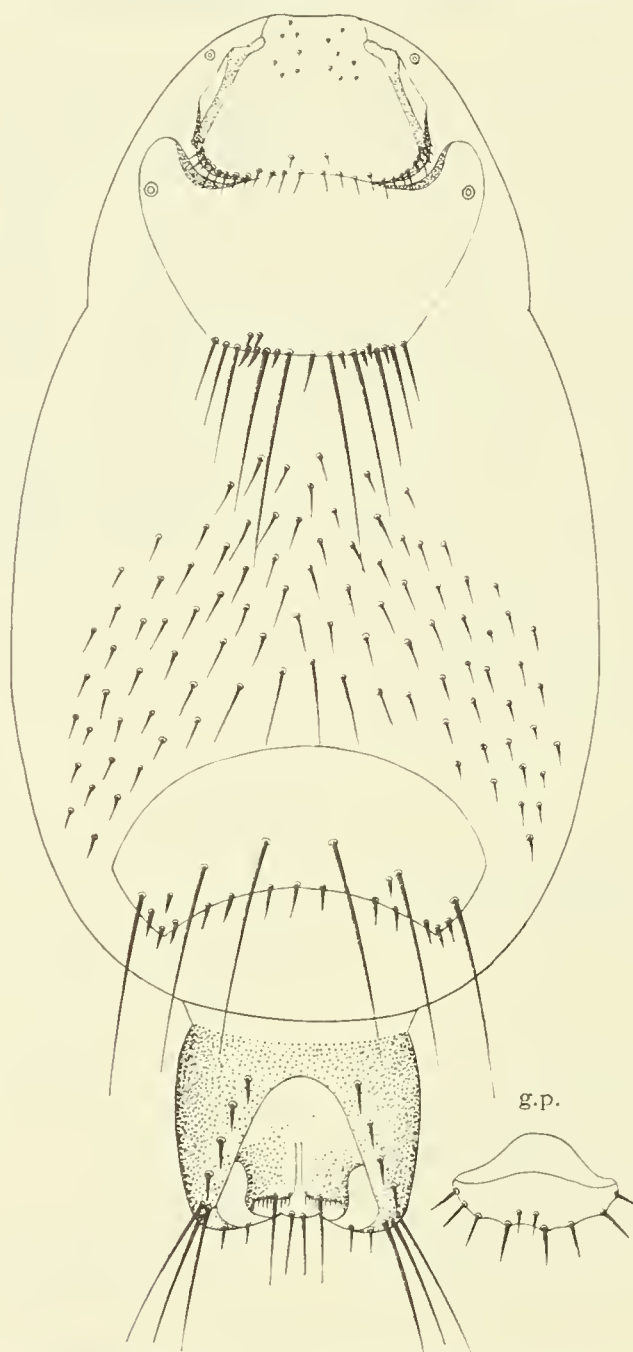


Fig. 79. *Nycteribia allotopoides* Theodor. Female abdomen, dorsal, and genital plate.

following: In the male the aedeagus is straight with a marked dorsal bulge and ends in a long, thin tip. The parameres are straight, tapering to a thin point and bear a longer seta at the tip and a shorter seta further basally. The anal segment is shorter than in *N. allotopa*, not longer than tergites 5 and 6 together and is widening less at the base than in *N. allotopa*.

In the female all setae are shorter than in *N. allotopa*. Tergite 6 bears 6 long vertical setae and the setae anterior to this tergite are only little longer than the short setae of the connexivum. These do not extend posteriorly beyond the anterior margin of tergite 6. The genital plate is weakly sclerotized, has the shape of a shallow triangle with a curved posterior margin which bears 6–8 widely spaced short spines and 1–2 smaller premarginal spines. Anal segment broader than in *N. allotopa* with a shallower incision posteriorly.

## MATERIAL IN THE COLLECTION

## BURMA

Fort Ava near Mandalay, from *Miniopterus* sp. no. 2, 22.xi. 1937, G. Heinrich, 1 ♂ 1 ♀ (Brit. Mus. 1946.289).

## OTHER MATERIAL EXAMINED

## PHILIPPINES

Luangbay cave, Davao, Mindanao, from *Miniopterus australis* and *Miniopterus schreibersi eschscholtzii*, 22.x. 1946, type series, Chicago Natural History Museum.

***Nycteribia dentata* n.sp.**

(Figs. 80–82)

*Nycteribia pedicularia* Latreille. Scott, 1925, *Rec. Ind. Mus.* 27, 357 (pro parte).

Length 2–2.5 mm. Colour brown. Head and thorax as in *N. pedicularia*.

*Male abdomen.* Tergite 1 with a marginal row of moderately long, thin setae and a premarginal row of shorter setae. Sternite 5 with a deep concavity at the posterior margin and 12–14 short spines in the middle, the median two spines shorter than the others. Abdomen otherwise similar to that of *N. pedicularia*.

*Genitalia.* Basal arc rounded, without anterior process. Claspers short and straight. Aedeagus slender, long, curving upwards and tapering to a rounded tip. Parameres broad, with a long apical end and a long, sharp ventral tooth and a deep concavity between the two processes. Apodeme with a broad end plate.

*Female abdomen.* Tergite 1 with a single premarginal row of short hairs. Tergite 2 rounded, with a marginal row of about 18 long setae in the middle and 8–10 short spines between them. Some minute hairs in the posterior part of the surface. Distribution of hairs between tergites 2 and 6 as in *N. pedicularia*, but with a few lateral to tergite 6. This is narrower and longer than in *N. pedicularia*, with 6 long premarginal setae alternating with spines which may stand in groups of two. Anal segment small, much shorter and narrower than in *N. pedicularia*, with prominent anal processes which bear a group of 4–6 setae. Genital plate large, rounded posteriorly, with a marginal row of about 15 long spines and a few premarginal ones. Ventral plate not discernible.

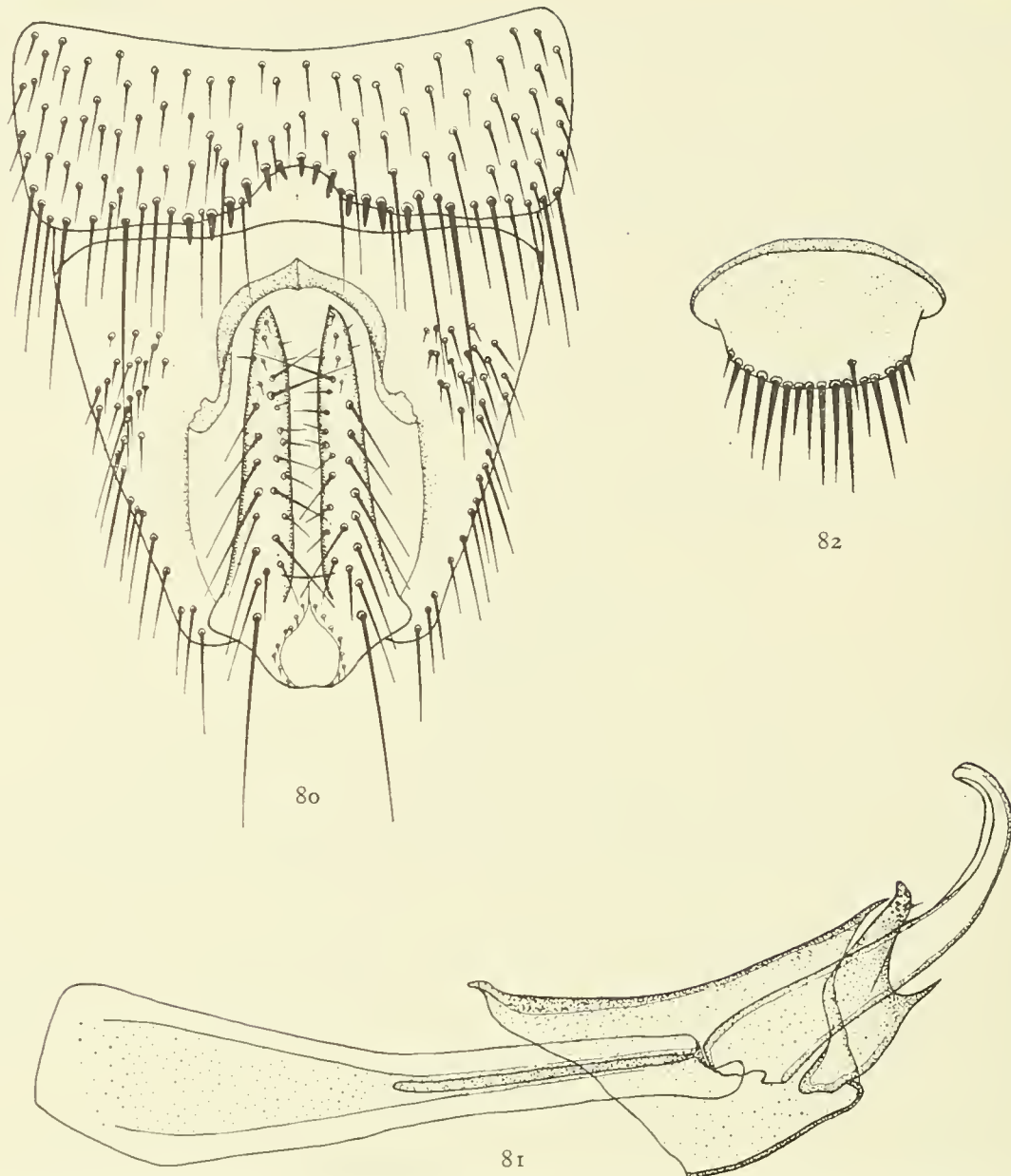
The species differs from *N. pedicularia* in the arrangement of the spines on sternite 5 and the structure of the genitalia in the male, by the shape of tergite 2, of the anal segment and the genital plate in the female.

Male holotype and female paratype in the Indian Museum, Calcutta.

## MATERIAL IN THE COLLECTION

## KASHMIR

Bumbroo Cave, Matan, Pahlgam Road, from *Myotis longipes*, 1 ♂ 1 ♀ paratypes.



Figs. 80-82. *Nycteribia dentata* n.sp. 80. male sternite 5 and genital area; 81. male genitalia; 82. female genital plate.

HOST SYNONYMY

Name on original label  
*Leuconoe longipes* Dobson.

Current name  
*Myotis (Leuconoe) longipes* Dobson.

***Nycteribia formosana* (Karaman, 1939)**

(Figs. 83-86)

*Listropodia formosana*. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Nycteribia pedicularia* Latreille. Scott, 1913, *Arch. Naturgesch.* **79**, 92.

*Nycteribia pedicularia* Latreille. Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (Chinese record).

*Nycteribia pedicularia* Latreille. Scott, 1936, *Jour. Linn. Soc. Zool.* **39**, 479.

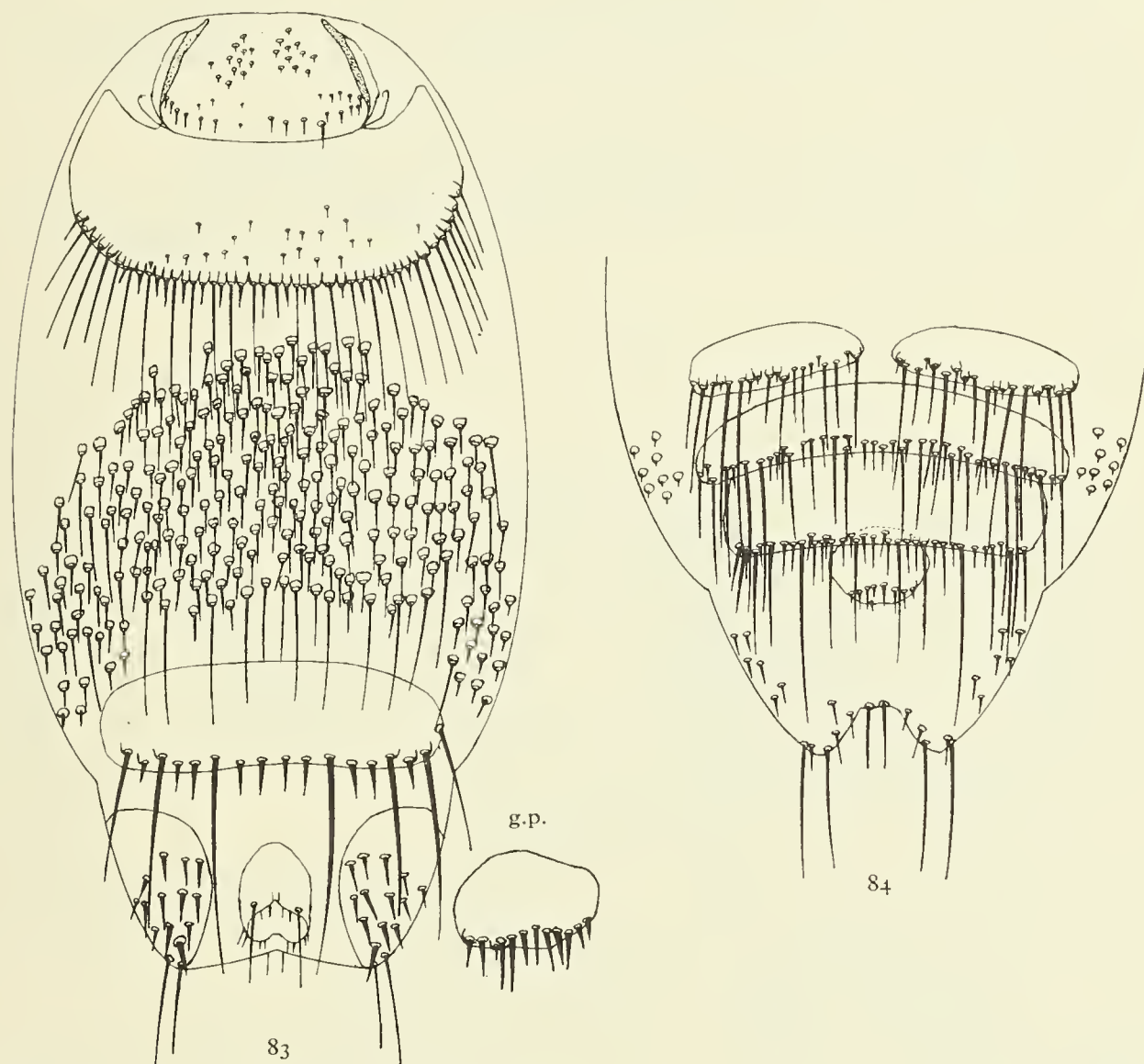
*Nycteribia formosana* Karaman. Theodor, 1954, in Lindner, *Die Fliegen der Palaearktischen Region*, **66a**, 16.

Length 3 mm. Head and thorax as in *N. pedicularia*.

*Male abdomen*. This resembles that of *N. pedicularia*, but tergite 4 has a large group of hairs



on the surface, while in *N. pedicularia* this is bare or has only a few hairs. Phallobase conical, without dorsal bulge. Claspers shorter and more pointed than in *N. pedicularia*. Aedeagus with thick, rounded basal part and tapering to a point. Parameres short, with an apical curved process and a dorsal process with a longer and a shorter seta at the base.



Figs. 83, 84. *Nycteribia formosana* (Karaman). Female. 83. abdomen, dorsal, and genital plate; 84. same ventral, posterior part.

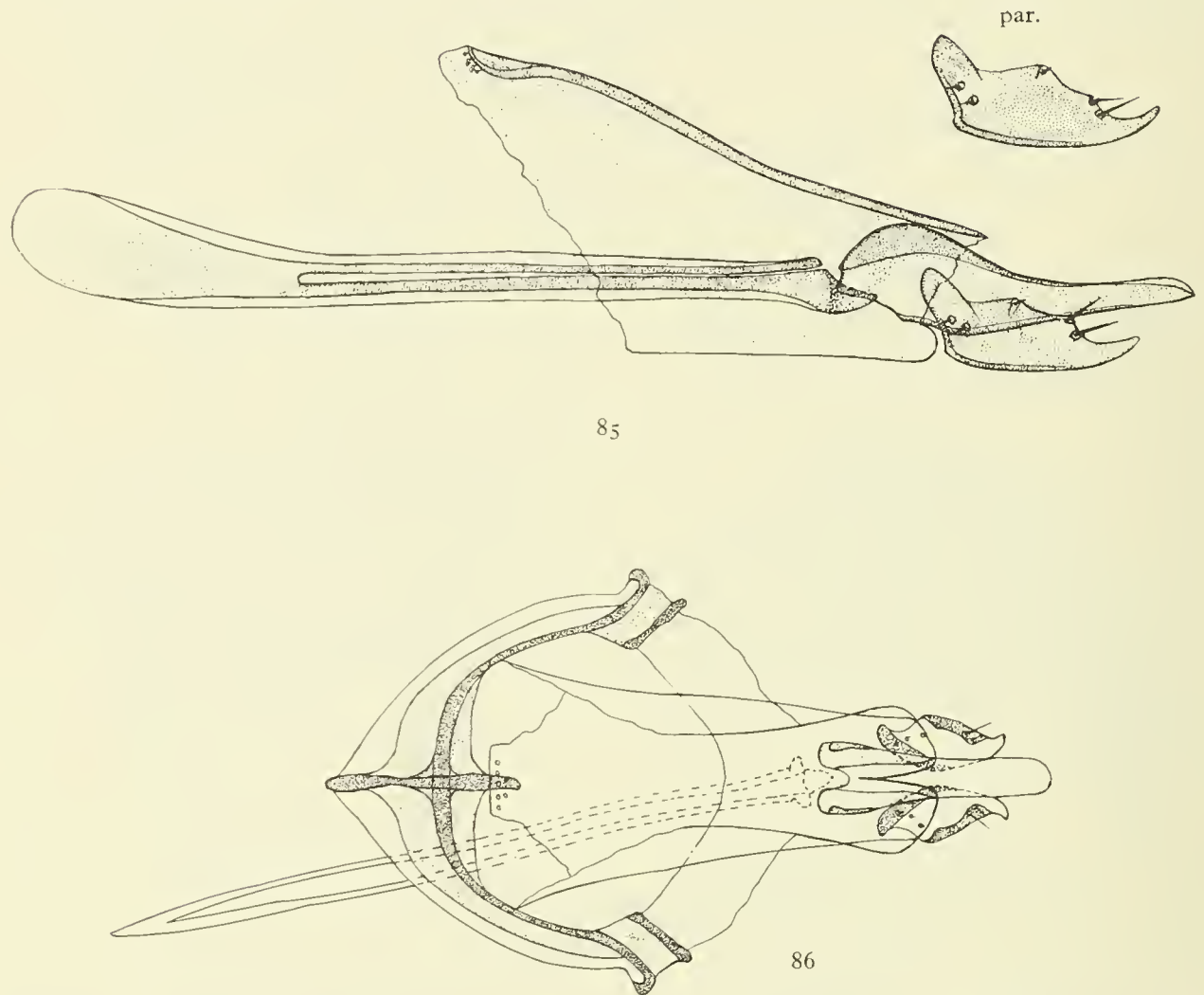
*Female abdomen.* Tergite 2 broadly rounded, with a marginal row of about 25 long setae which reach further laterally than in *N. pedicularia* and some short spines between them, mainly in the middle. The short hairs of the surface are restricted to the posterior third. The hairs on the connexivum between tergite 2 and 6 are more numerous and longer than in *N. pedicularia* and extend on to the pleurae lateral to tergite 6. Tergite 6 with 6 long setae and about 10 long spines (14–18 in *N. pedicularia*). The two lateral sclerites of sternite 5 reach nearly to the

# NYCTERIBIINAE

# NYCTERIBIA

midline, and there are no setae between them. Genital plate broadly elliptical, with a row of spines forming an obtuse angle.

Distribution: China, Kiangsu, Formosa, Japan(?).



Figs. 85, 86. *Nycteribia formosana* (Karaman). Male. 85. genitalia, profile, with paramere; 86. same, dorsal.

## MATERIAL IN THE COLLECTION

### FORMOSA

Anping, from *Miniopterus schreibersi*, Sept. 1906, H. Sauter, 1 ♂ 1 ♀ (Brit. Mus. 1913.439).  
Tainan (Type locality), from *Miniopterus schreibersi*, 3.x. 1906, H. Sauter, 2 ♂ 2 ♀.

### CHINA

Taian, Shantung, from *Rhinolophus ferrumequinum nippon* and *Myotis ricketti*, 3.vi. 1926, E. Hindle, 2 ♂ 2 ♀.  
Tsinan, Shantung, from *Rhinolophus ferrumequinum nippon*, 2.vii. 1926, E. Hindle, 1 ♂.

## OTHER MATERIAL EXAMINED

### CHINA

Soochow, Kiangsu, from *Myotis ricketti*, May 1935, C. C. Liu, 1 ♂ 1 ♀. Chicago Natural History Museum.

## HOST SYNONYMY

Name on original label  
*Leuconoe ricketti* Thomas.

Current name  
*Myotis ricketti* Thomas.

*Nycteribia japonica* n.sp.

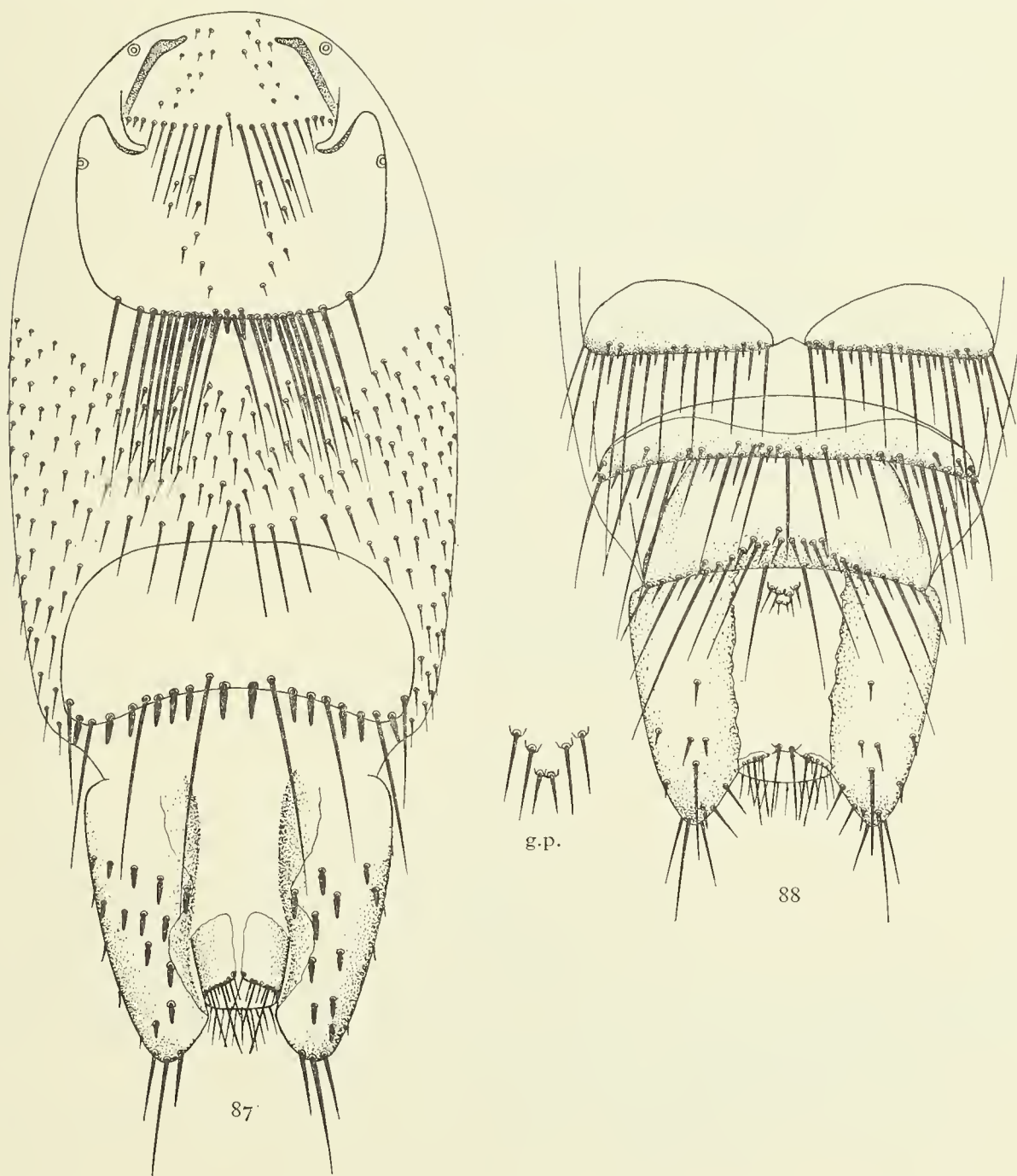
(Figs. 87-90)

Length 2-2.5 mm. Colour light brown.

*Head.* Dorsal surface membranous in its greater part. 4 setae at the anterior dorsal margin. Labella of the proboscis as long as the theca, 6-7 short spines on the genae.

*Thorax.* Wider than long, pattern as in *N. pedicularia*. 9-11 notopleural setae. Tibiae short and wide. Tibia 1 twice as long as wide, tibiae 2 and 3 2.5 times as long as wide.

*Male abdomen.* Tergite 1 with a double marginal row of fine setae. Tergites 2 and 3 with

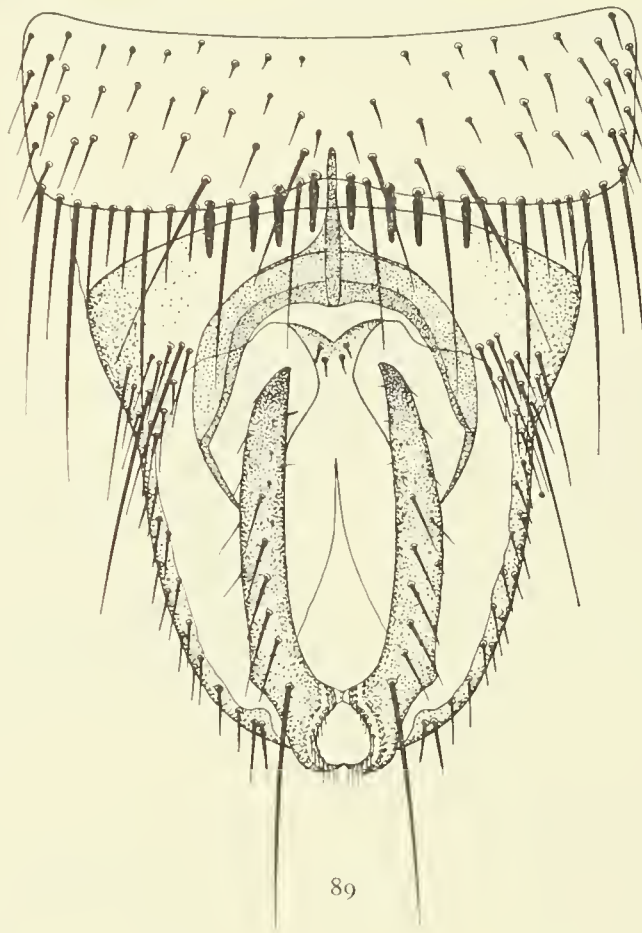


Figs. 87, 88. *Nycteribia japonica* n.sp. Female. 87. abdomen, dorsal; 88. same, ventral, posterior part.

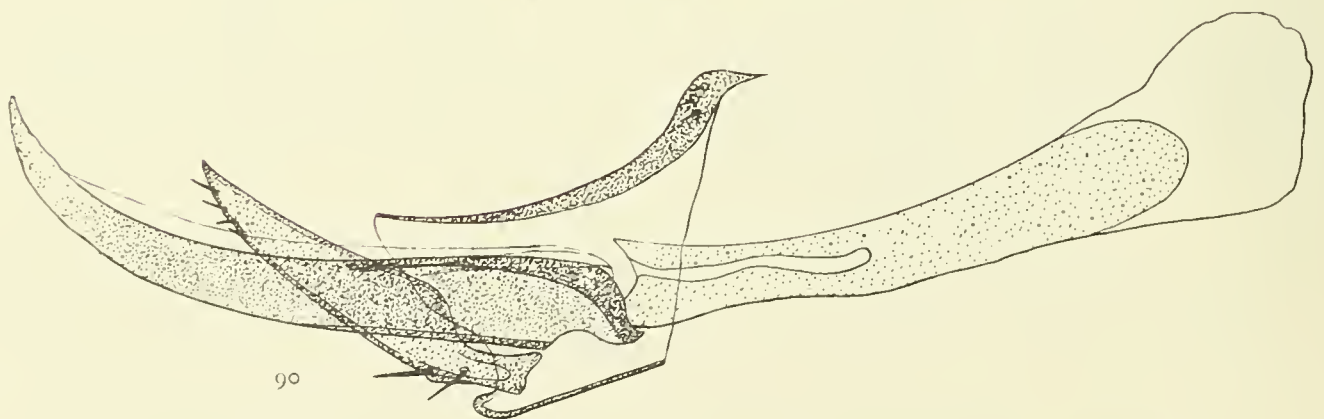


marginal rows of longer setae. Tergites 4-6 with long thick setae alternating with short spines; 6 such spines on tergite 4, 8-10 on tergites 5 and 6. The whole surface of tergites 2 and 3 covered with short hairs. Tergite 4 similar, but the hairs are longer and more widely spaced. Tergite 5 has such hairs only in the lateral thirds and tergite 6 is bare, except for a few premarginal hairs. Anal segment conical, with 2-3 rows of short spines in the middle. Ventral side much as in *N. pedicularia*. The whole surface of the sternites covered with short hairs. Sternite 5 with a marginal row of long setae alternating in the middle with long, thick spines. There are 8-11 such spines which may stand in groups of two.

*Genitalia.* Claspers straight, tapering to blunt points. Basal arc broad, rounded, with long



89



90

Figs. 89, 90. *Nycteribia japonica* n.sp. Male. 89. sternite 5 and genital area; 90. genitalia.

anterior process. Aedeagus long, tapering to a membranous tip, slightly curving upwards. Apodeme long, with a wide end plate. Parameres slender, triangular, with 3-4 very small hairs at the ventral edge near the tip and near the base.

*Female abdomen.* Very similar to *N. pedicularia*, differing as follows: Tergite 1 with a single marginal row of thin setae. Tergite 2 large, elliptical, surface bare except for a few short hairs near the middle line. Median part of the posterior margin with a row of about 20 long, closely standing setae and 4-5 short spines among them in the middle. Connexivum covered with short hairs extending on to the pleurae and beyond the hind margin of tergite 4. A row of longer setae in front of tergite 6. Tergite 6 with a rounded invagination\* of the anterior margin and with 6 vertical long setae at the margin, alternating with groups of 2-3 long spines. Surface bare. Two long horizontal setae at the lateral posterior corners. Anal segment long, dorsal surface covered with short spines on the lateral sclerites. Sternite 5 divided into lateral sclerites which reach the middle. Sternite 6 undivided. Both sternites with single marginal rows. Sternite 7 triangular or trapezoidal, with a single marginal row of long setae alternating with spines in the middle. A pre-marginal row of short spines in the middle. There is a small anal sclerite which bears 2 setae. The dorsal genital plate consists of a group of 5-6 short setae on isolated bases.

This is probably the species considered as *N. pedicularia* by Kishida (1932) which it resembles superficially. It differs from it, however, in chaetotaxy and the structure of the genitalia in both sexes.

JAPAN. Honshu, Miyagi, Prefecture Sawada, from *Myotis (Leuconoe) macrodactylus*, 12.v. 1952. ♂ holotype and about 40 paratypes of both sexes, A. J. Nicholson, Chicago Nat. Hist. Museum.

Same locality and date, from *Rhinolophus ferrumequinum nippon*, 20 specimens.

KOREA. Taegu, from *Pipistrellus savii velox*, 15.vi. 1955, Newman, Little, Plapp, 2 ♂ 2 ♀.

#### MATERIAL IN THE COLLECTION

##### JAPAN

Honshu, Miyagi, from *Myotis macrodactylus*, 12.v. 1952, 2 ♂ 2 ♀ paratypes.

#### *Nycteribia kolenatii* Theodor & Moscona, 1954

(Figs. 91-93)

*Listropodia blasii*. Kolenati, 1863 (nec 1856), *Hor. Soc. Ent. Ross.* **2**, 9.

?*Nycteribia latreillii* Leach. Curtis, 1829, *Brit. Entomology*, **8**, 277.

?*Nycteribia latreillii* Leach Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275.

*Nycteribia blasii* Kolenati. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Listropodia blasii* Kolenati. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Listropodia pedicularia blasii* Kolenati. Karaman, 1939, *Bull. Soc. Sci. Skoplje*, **20**, 131.

*Nycteribia kolenatii*. Theodor & Moscona, 1954, *Parasitology*, **44**, 157 (nom.nov.).

*Nycteribia kolenatii* Theodor & Moscona. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**,

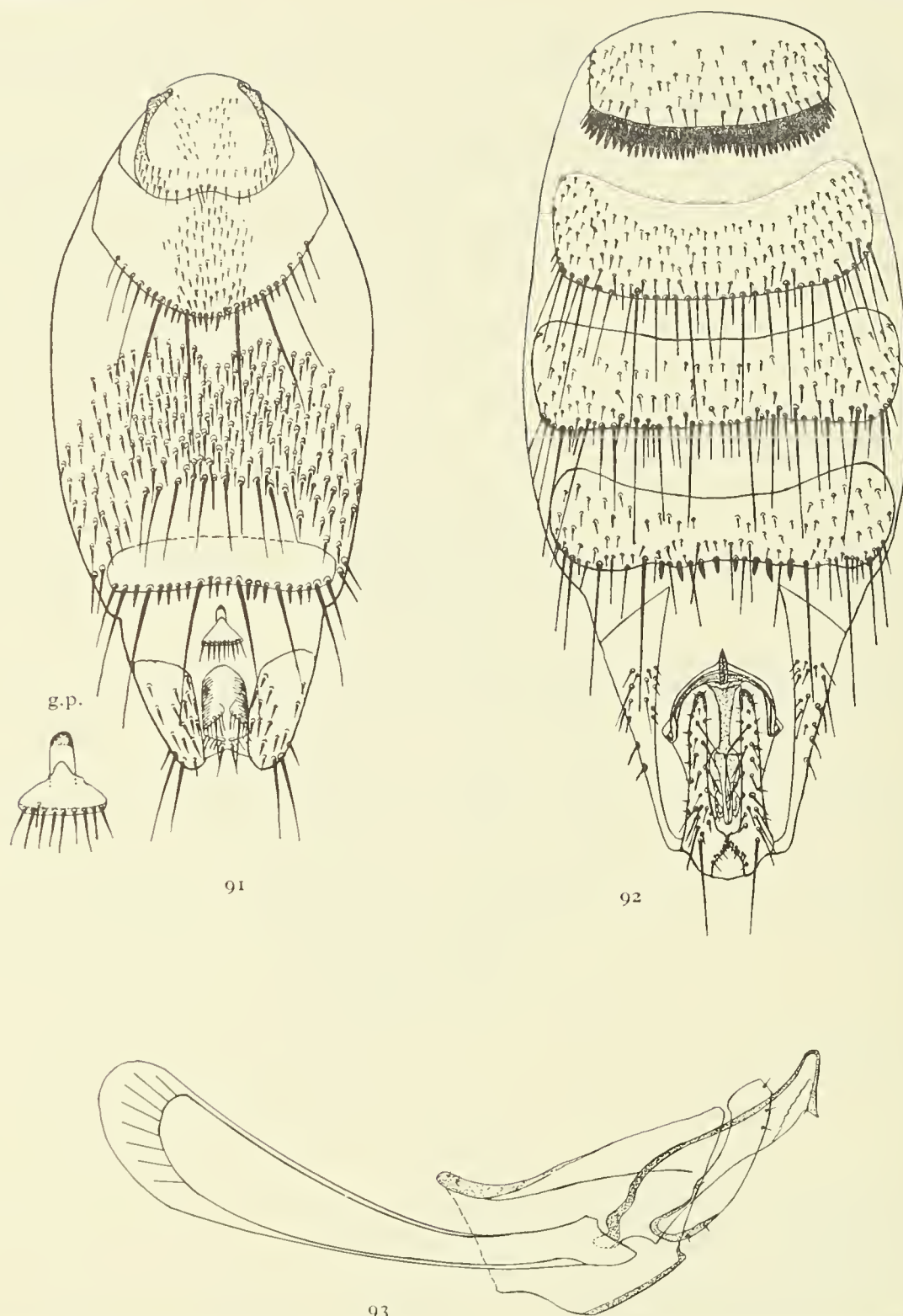
17.

*Nycteribia kolenatii* Theodor & Moscona. Grulich & Povolny, 1955, *Fol. Zool. Ent.* **4**, 111.

*Nycteribia kolenatii* Theodor & Moscona. Schuurmans Stekhoven, 1955, *Wetenschap. Medel.* **16**, 1.

Length 2-2.5 mm. Head, thorax and legs as in *N. pedicularia*.

\* This invagination is not shown in Fig. 87 which was made from a balsam preparation.



Figs. 91-93. *Nycteribia kolenatii* Theodor & Moscona. 91. female abdomen, dorsal, and genital plates; 92. male abdomen, ventral; 93. male genitalia.

*Male abdomen.* Similar to *N. pedicularia*, but there are only 7-8 spines on the posterior margin of sternite 5 in most specimens, rarely 5 or 9-10. Phallobase conical, without a dorsal bulge. Aedeagus relatively longer and more slender than in *N. pedicularia*, more than half the length of the apodeme. The ventral tooth of the aedeagus is closer to the tip than in *N. pedicularia*, at about the apical quarter or fifth.



*Female abdomen.* Similar to *N. pedicularia*, but tergite 2 is longer and more strongly convex or triangularly produced posteriorly, with about 4 long setae in the middle of the posterior margin and shorter setae laterally. Tergite 2 is as long or longer in the middle than the width of tergite 1. Dorsal genital plate triangular, with about 8–10 setae which are about as long as the plate. Ventral plate very narrow.

Distribution: Europe.

MATERIAL IN THE COLLECTION

BRITISH ISLES

- Henley-on-Thames, from *Myotis daubentoni*, 14.ii. 1906, N. C. Rothschild, 2 ♀.
- Henley-on-Thames, from *Myotis daubentoni*, 2.xi. 1906, F. J. Cox, N. C. Rothschild, 3 ♂ 5 ♀.
- Henley-on-Thames, from *Myotis daubentoni*, 3.xii. 1938, M. Blackmore, 3 ♀ (Brit. Mus. 1938.709).
- Henley-on-Thames, from *Myotis nattereri*, 3.xii. 1938, M. Blackmore, 1 ♂ (Brit. Mus. 1938.709).
- Teddington, Middlesex, from *Myotis daubentoni*, 20.viii. 1907, A. H. Bishop, N. C. Rothschild, 1 ♀.
- Slough, Bucks, 1950, B. J. Southgate, 2 ♀.
- High Wycombe Church, Bucks, taken from puparia, June 1934, G. D. Hale Carpenter, Imp. Inst. Entom., 1 ♂ 3 ♀.
- Christchurch, Hants, from *Myotis daubentoni*, 20.ix. 1909, N. C. Rothschild, 1 ♂ 1 ♀. May 1915, F. J. Cox, A. Whitaker, N. C. Rothschild, 1 ♂ 3 ♀.

- Wells Cathedral, Somerset, from *Myotis daubentoni*, 19.vi. 1906, A. Whitaker, N. C. Rothschild, 1 ♀.
- Stainboro Park, Barnsley, Yorkshire, from *Myotis daubentoni*, 18.vi. 1906, A. Whitaker, N. C. Rothschild, 1 ♀.
- Barnsley, Yorkshire, from *Myotis nattereri*, 12.vii. 1911, A. Whitaker, N. C. Rothschild, 1 ♀.

FRANCE

- Dept. de l'Eure, from *Myotis daubentoni*, H. G. Kerville, N. C. Rothschild, 1 ♂.
- Dept. de l'Eure, from *Vespertilio murinus*, H. G. Kerville, N. C. Rothschild, 1 ♂.
- Mauny, from *Myotis daubentoni*, H. G. Kerville, N. C. Rothschild, 3 ♂ 4 ♀.
- France (?), 3 ♀ 1 ♀, from Piaget collection from Museum Neuchâtel (Brit. Mus. 1928.325).

ITALY

- Pisa, from *Myotis daubentoni*, Oct. 1915, N. Cimbali, N. C. Rothschild, 10 ♂ 12 ♀.

OTHER MATERIAL EXAMINED

From Holland, from *Myotis daubentoni*, *M. dasynceme*, *M. mystacinus*, *Vespertilio murinus*. From Austria, Tyrol and Germany without host. From France, Angers, from *Myotis daubentoni* and *Eptesicus serotinus*.

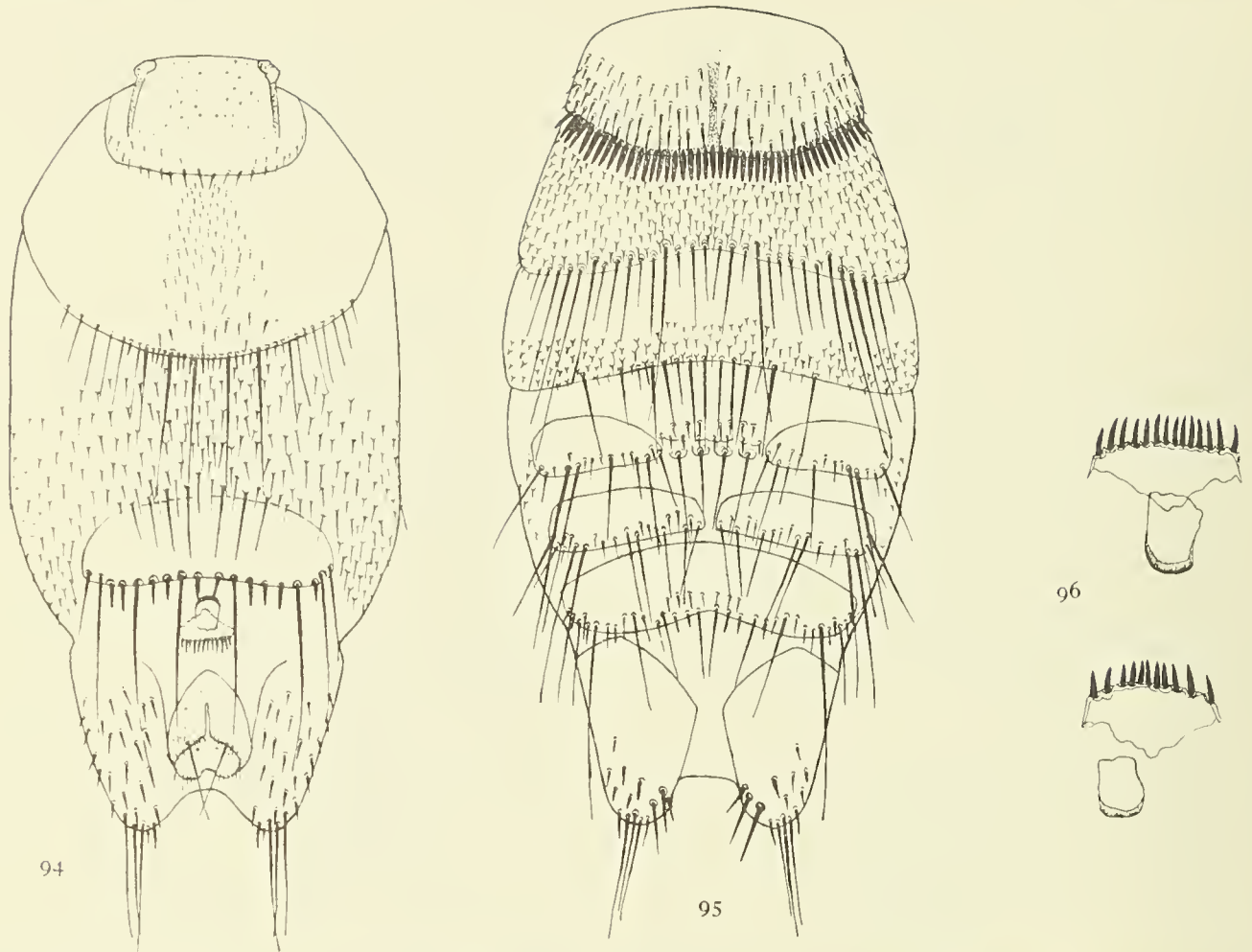
**Nycteribia latreillii** (Leach, 1817)

(Figs. 3–8, 18, 22, 23, 25, 29, 35, 36, 47, 54, 58, 94–98)

- Phthiridium latreillii*. Leach, 1817, *Zool. Misc.* 3, 54.
- Nycteribia latreillei* Leach. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.
- Listropodia latreillei* Leach. Kolenati, 1863, *Hor. Soc. Ent. Ross.* 2, 9.
- Listropodia latreillii* Leach. Rondani, 1879, *Bull. Soc. Ent. Ital.* 11, 9.
- Nycteribia biscutata*. Gil Collado, 1934, *Eos*, 9, 29. (Abnormal specimen.)
- Nycteribia* (?) *blasii* Kolenati. Corradetti, 1934, *Riv. Malariol.* 13, 338.
- Nycteribia latreillei* Leach. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, 17, 9.
- Listropodia latreillei* Leach. Karaman, 1939, *Ann. Mus. Serb. merid.* 1, 31.
- Listropodia latreillei africana*. Karaman, 1939, *Ann. Mus. Serb. merid.* 1, 31.
- Nycteribia latreillii* Leach. Theodor and Moscona, 1954, *Parasitology*, 44, 157.
- Nycteribia latreillii* Leach. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 17.
- Nycteribia latreillii* Leach. Schuurmans Stekhoven, 1955, *Wetenshap. Medel.* 16, 1.
- Nycteribia latreillii* Leach. Aellen, 1955, *Bull. Soc. Neuchâtel Sci. nat.* 78, 81.
- Nycteribia latreillii* Leach. Balcells, 1956, *Speleon*, 6, 287.
- Nycteribia latreillii* Leach. Hurka, 1958, *Fol. Zool.* 7, 231.
- Nycteribia latreillii* Leach. Aellen, 1959, *Rev. Suisse Zool.* 66, 555.

Length 3 mm. Colour brown. Head and thorax similar to *N. pedicularia*.

*Male abdomen.* Tergite 4 with a group of short hairs in the middle of the surface and a few



Figs. 94-96. *Nycteribia latreillii* (Leach). Female. 94. abdomen, dorsal; 95. same, ventral; 96. genital plates.

hairs on the sides of the surface on tergites 5 and 6. Sternite 5 with an irregular row of 14-18 spines, the lateral spines very long. All setae longer and stronger than in *N. pedicularia*. Phallobase conical, without a dorsal bulge. Aedeagus tapering to a rounded point with a ventral tooth near the end.

*Female abdomen.* Tergite 2 as long as, or longer than, the width of tergite 1, strongly convex posteriorly, with 6-8 long setae in the middle of the posterior margin, shorter setae laterally and spines between the long setae. A large group of short hairs on the surface. The short hairs on the pleurae reach laterally to tergite 6. Dorsal genital plate triangular with truncated sides and a row of 13-15 strong spines. Ventral plate broad.

Distribution: Continental Europe, North Africa, West Asia.

#### MATERIAL IN THE COLLECTION

No locality, given by Kolenati, in the original little bottles, 2 ♂ 3 ♀ (Brit. Mus. 1856.163).

#### PORTUGAL

Monchique, from bat, 12.v. 1910, K. Jordan, N. C. Rothschild, 1 ♂.

Font Alva near Barbacena, Alentejo, from *Rhinolophus ferrumequinum*, 14.x. 1935, E. Schwarz, 1 ♀.

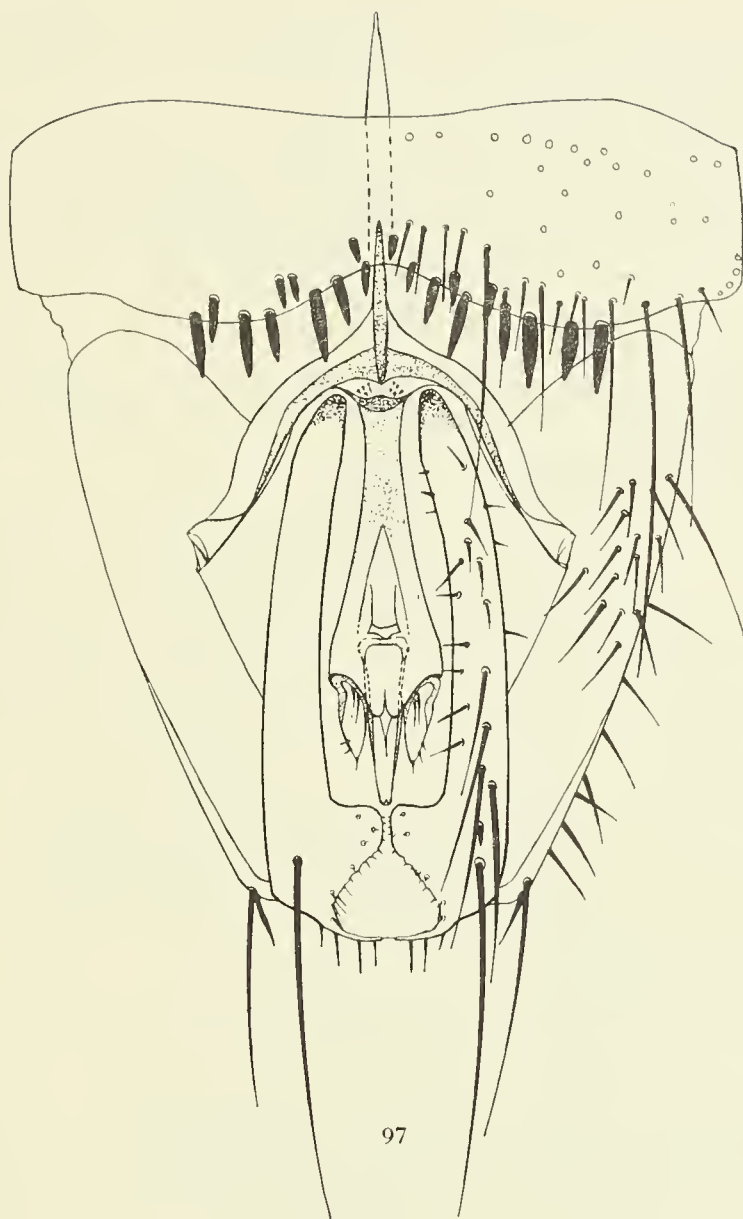
#### ITALY

Isola Bella, Lago Maggiore, 16.viii. 1901, N. C. Rothschild, 50 ♂ ♀.

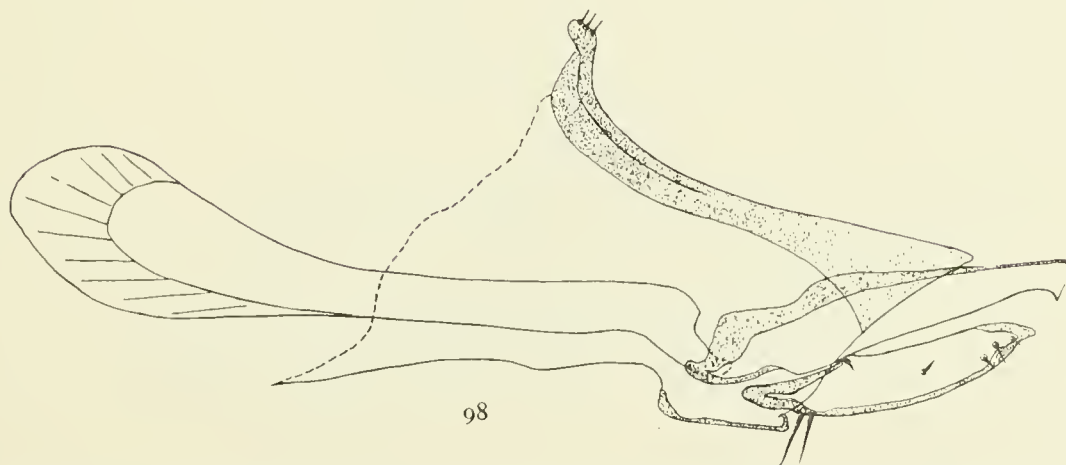
Grosseto, from *Miniopterus schreibersi*, 1915, N. Cimbali, N. C. Rothschild, 1 ♂.

Toscana, from *Vespertilio murinus*, 1915, N. Cimbali, N. C. Rothschild, 4 ♂.

Cremona, from *Vespertilio murinus*, don. Brunetti, 1 ♂ 1 ♀ (Brit. Mus. 1927.184).



97



98

Figs. 97, 98. *Nycteribia latreillii* (Leach). Male. 97. sternite 5 and genital area; 98. genitalia.



# NYCTERIBIINAE

## JUGOSLAVIA

- Novi Cave, Croatia, from *Myotis myotis*, 1910, F. Dobiasek, N. C. Rothschild, 3 ♂ 6 ♀.  
Novi Cave, Croatia, from *Rhinolophus ferrumequinum*, 1910, N. Dobiasek, N. C. Rothschild, 1 ♂ 8 ♀.

## MOROCCO

- Mazagan, from *Myotis myotis*, 9.vii. 1901, W. Riggensbach, N. C. Rothschild, 2 ♂.

## ALGERIA

- From *Myotis myotis*, Tomes, 1 ♂ 1 ♀ (Brit. Mus. 57.7).  
Djebel Taya, from *Myotis blythi oxygnathus*, 14.ii. 1911, E. Hartert, C. Hilgert, presented by W. Rothschild, N. C. Rothschild, 5 ♂ 3 ♀.  
Subterranean lake, Hammam Meskoutine, from *Myotis blythi oxygnathus*, 1.iv. 1913, P. A. Buxton, 3 ♂ 2 ♀ (Brit. Mus. 1913.26).

# NYCTERIBIA

- Hammam Meskoutine, from *Rhinolophus hipposideros*, May 1914, K. Jordan, W. Rothschild, pres. N. C. Rothschild, about 50 ♂ ♀.

## TUNISIA

- Djebel Gloub, Kroumirie, from *Myotis myotis*, H. G. Kerville, N. C. Rothschild, 5 ♂.  
From *Myotis blythi oxygnathus*, 1919, M. Weiss, R. Newstead, 1 ♀.

## TURKEY

- Ararat, Karasu spring, from *Myotis blythi oxygnathus* 29.vi. 1960, K. M. Guichard, 1 ♀.

## SYRIA

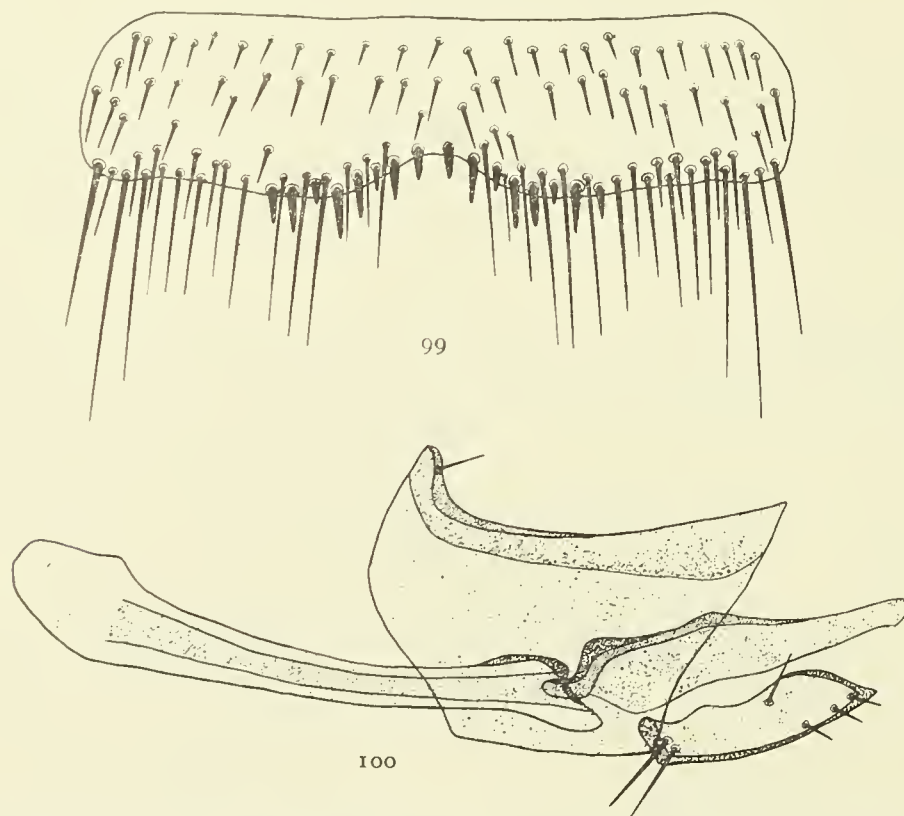
- Banias near Mt Hermon, from *Myotis myotis*, 5.x. 1947, O. Theodor, 1 ♂ 1 ♀ (Brit. Mus. 1948.37).

## OTHER MATERIAL EXAMINED

France, from *Myotis myotis*. Germany, from *Rhinolophus hipposideros*. Italy, from *Myotis myotis*, *M. capaccinii*, *Rhinolophus euryale*.

## HOST SYNONYMY

Name on original label	Current name
<i>Vespertilio murinus</i> L. (North African records and probably some Italian records.)	<i>Myotis myotis</i> Borkhausen or <i>Myotis blythi oxygnathus</i> Monticelli.
<i>Myotis oxygnathus</i> Monticelli.	<i>Myotis blythi oxygnathus</i> Monticelli.
<i>Rhinolophus hipposideros</i> Schrank.	<i>Rhinolophus ferrumequinum</i> Schreiber.



Figs. 99, 100. *Nycteribia latreillii* subsp.(?). Male. 99. sternite 5; 100. genitalia.

**Nycteribia latreillii** (Leach) subsp. ?

(Figs. 99, 100)

A single damaged male which resembles *N. latreillii* closely, shows some differences in the genitalia. The aedeagus has no ventral tooth, but a shallow bulge and the parameres are broader and have a longer and more pointed tip. These differences may not be significant and particularly the lack of the ventral tooth on the aedeagus may be accidental. More material of both sexes is necessary to determine the status of this form.

INDIA. Masuri (? Mussooree near Dehra Dun), from *Vespertilio murinus*, Capt. Huttons, N. C. Rothschild, 1 ♂.

*Vespertilio murinus* does not occur in India and the host is probably a species of *Myotis*.

**Nycteribia parvula** Speiser, 1901

(Figs. 101-104, 106-110)

*Nycteribia parvula*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia sauteri*. Scott, 1908, *Trans. Ent. Soc. London*, **1908**: 359.

*Nycteribia parvula* Speiser. Scott, 1913, *Arch. Naturgesch.* **79**, 92.

*Nycteribia parvula* Speiser. Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, ser. 8, 209.

*Nycteribia parvula* Speiser. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Nycteribia parvula* Speiser. Ferris, 1924, *Phil. Jour. Science*, **25**, 391.

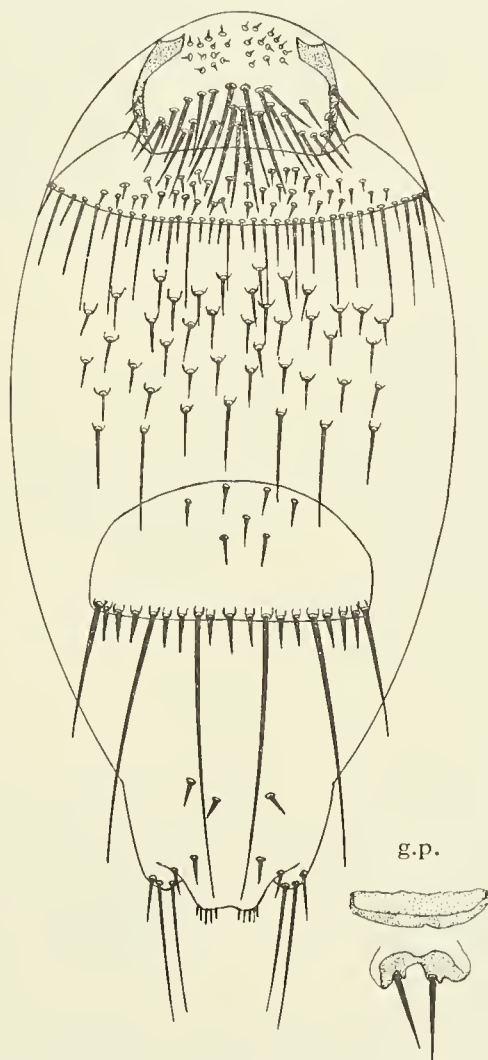


Fig. 101. *Nycteribia parvula* Speiser. Female abdomen, dorsal, and genital plates.

*Listropodia parvula* (Speiser). Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Nycteribia parvula* Speiser. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 18.

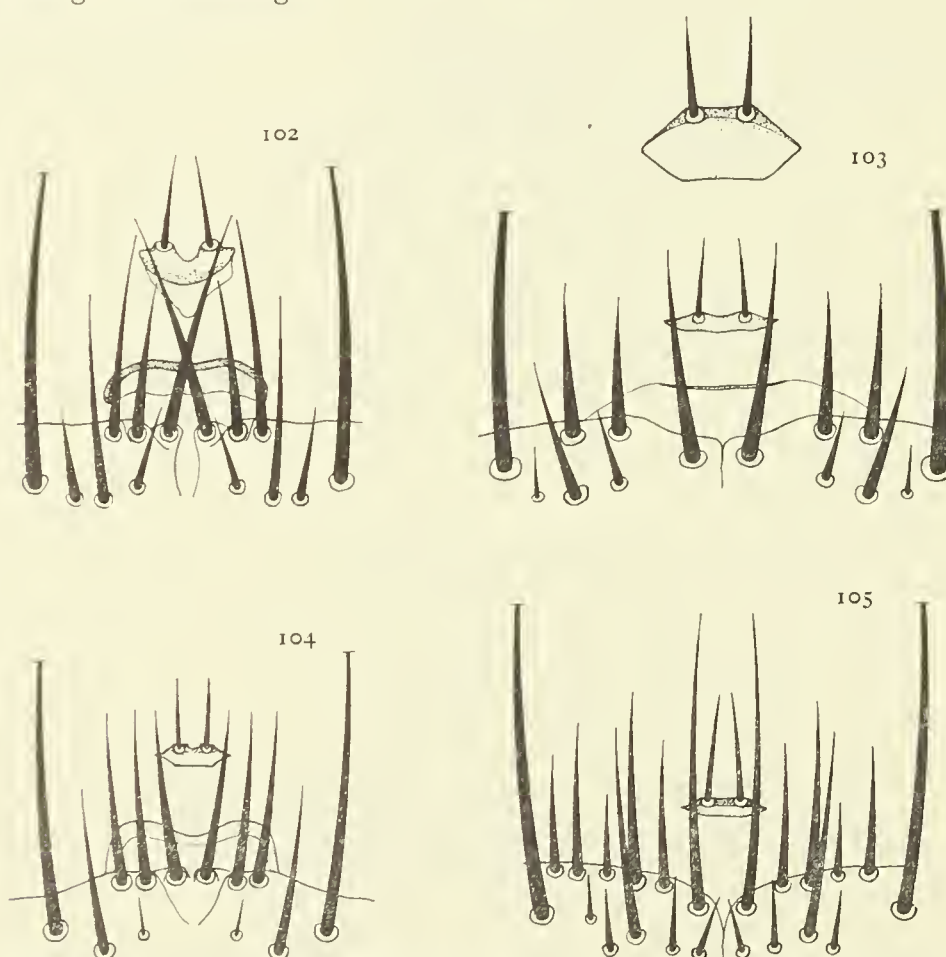
*Nycteribia parvula* Speiser. Hiregaudard & Bal, 1956, *Agra Univ. Jour. Res. (Science)*, **5**, 1.

*Nycteribia parvula* Speiser. Theodor, 1963, *Feldiana, Zoology*, **42**, 151.

The exact morphology of the types is not known, but a female from West Java proved identical with specimens from Formosa which will therefore be considered provisionally as the typical form.

Length 1.5–1.75 mm. Head with 2 setae at the anterior dorsal margin. Mesonotum narrow, 12 notopleural setae which are shorter anteriorly, the two anterior ones having the form of spines. The tibiae, particularly tibiae 2 and 3, are more slender than in other species, tibia 3 being 3 or even 3.5 times as long as wide.

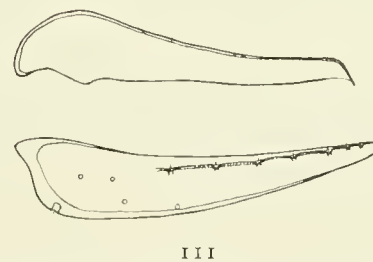
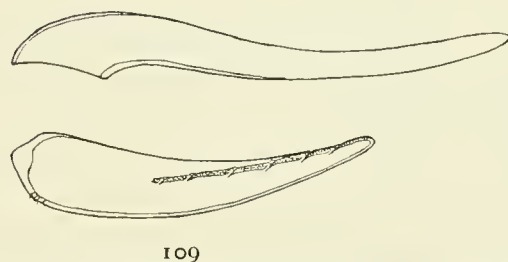
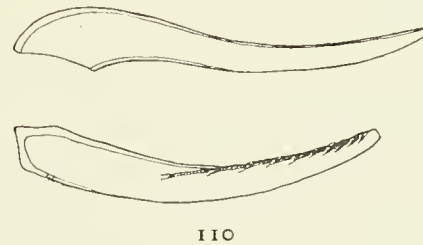
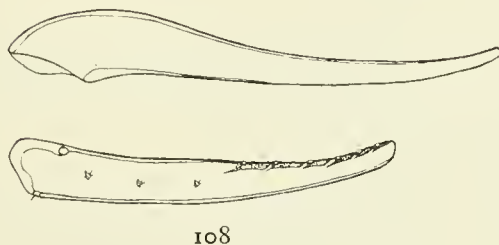
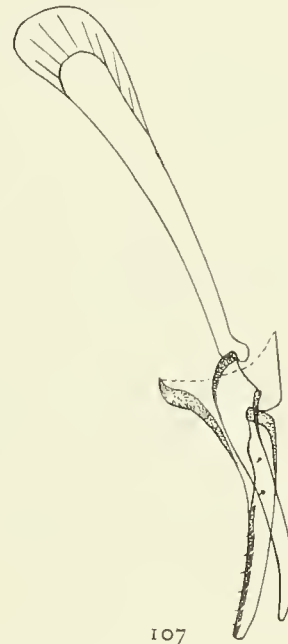
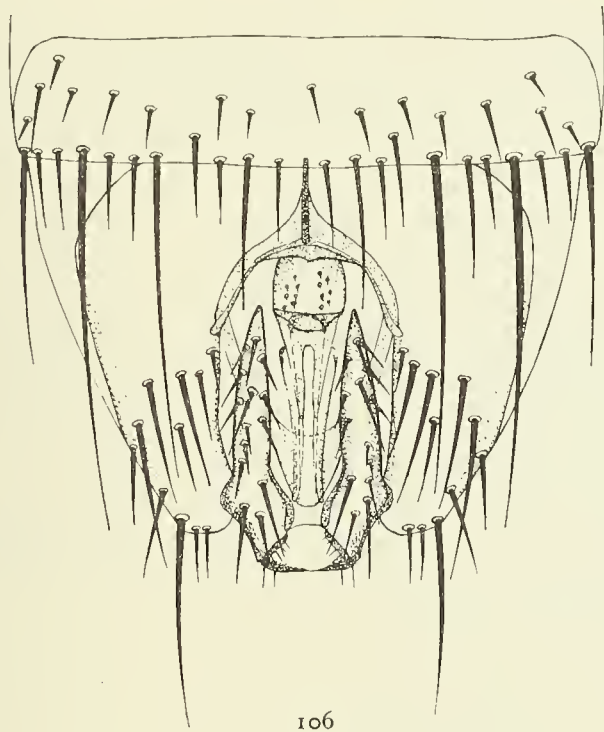
*Male abdomen.* Tergites 2–3 with moderately long, thin and short setae at the hind margin and short hairs in the middle of the surface. Tergites 4–6 with 2–4 long setae in the middle of the hind margin and short spines between them. A few short hairs on the surface of tergite 4, tergites 5 and 6 bare. Anal segment very short and truncate. Sternite 5 with only setae at the hind margin, the group of spines which is present in most other species being absent. Claspers short, pointed, not pigmented. Aedeagus slender, tapering, slightly curved, with rounded tip. Parameres slender, slightly curved, tapering gradually to a blunt end; about 6 minute hairs with oblique bases along the dorsal edge.



Figs. 102–105. 102–104. *Nycteribia parvula* Speiser. Female. Sternite 7 and genital plates of specimen from: 102. Formosa; 103. Ceylon (2 aspects of dorsal plate); 104. Philippines; 105. of *N. parvuloides*.



*Female abdomen.* Tergite 1 with several rows of moderately long setae near the posterior margin. Tergite 2 very short, with moderately long, thin setae at the hind margin and short hairs on the surface. Tergite 6 broad, with 5-6 long setae at the hind margin which alternate with groups of 1-3 spines. Only a few (4-6) short spines on the surface. 25-30 short hairs in 4-5 rows form a rounded group on the connexivum between tergites 2 and 6 and there is a row of longer setae anterior to tergite 6. Anal segment very short and truncate. Abdominal ctenidium with 40-44 spines. Sternite 7 with 2 groups of 3 closely placed setae in the middle of the hind



Figs. 106-111. 106-110. *Nycteribia parvula* Speiser. Male. 106. sternite 5 and genital area; 107. genitalia; aedeagus and paramere of specimen from: 108. Formosa; 109. Ceylon; 110. Philippines; 111. of *N. parvuloides*.

margin, occupying approximately the width of the ventral genital plate which is broad, curved, strongly sclerotized and without setae. Dorsal genital plate with 2 setae and a more or less deep concavity between them.

As regards the formation of local forms, the position resembles that in *N. allotopa*, with which *N. parvula* nearly always occurs together. In the Philippines two forms were found occurring together. One of these is closely related to the Formosa form and may eventually prove a subspecies. The other form was found in a single locality only in the Philippines and has been described as *N. parvuloides*.

*Philippine form.* This differs from the Formosa form in the male in having aedeagus and parameres shorter and in the female having the concavity between the two setae of the dorsal genital plate shallower and the ventral plate weakly sclerotized. There are only 4 long setae at the hind margin of tergite 6.

*Ceylon and Bombay form.* Male. Aedeagus slender, with a narrow base. Parameres triangular with pointed tip. Female. Tergite 6 with 6 long setae at the hind margin. Dorsal genital plate with a shallow concavity between the two setae. Ventral genital plate absent. The 2 groups of setae at the hind margin of sternite 7 are widely spaced, the distance between the median seta and the next is greater than between the two lateral setae. The setae are much shorter and thicker than in the Formosa form. The group of hairs on the connexivum between tergites 2 and 6 is triangular and consists of 16–18 hairs.

Distribution: Sumatra (type locality), Java, India, Ceylon, Burma, Moluccas, Philippines, Japan, Formosa.

Type series in the Museo Civico di Storia Naturale, Genoa.

## MATERIAL IN THE COLLECTION

## INDIA

Mahabaleshwar, near Bombay, from *Miniopterus schreibersi fuliginosus*, 13.iv. 1912, F. H. Gravely, ex coll. Indian Museum, 1 ♂ 2 ♀.

## CEYLON

Peradeniya, from *Miniopterus schreibersi fuliginosus*, 30.i. 1912, J. C. F. Fryer, 1 ♂.

Lunugala, Uva, 10.vii. 1913, E. W. Mayor, 1 ♀.

Dammeria, Passara, Uva, from *Miniopterus schreibersi fuliginosus*, 15.v. 1922, W. W. A. Phillips, 2 ♂.

Mousakande, Gammaduwa, 10.ii. 1926, W. W. A. Phillips, circ. 20 ♂ ♀.

Kosgolla, Namunukula, Uva, from *Miniopterus schreibersi fuliginosus*, 7.viii. 1955, W. W. A. Phillips, 3 ♂ 2 ♀.

## BURMA

Mandalay and Fort Ava, near Mandalay, from *Miniopterus* sp., 22.xi. 1937, G. Heinrich, 6 ♂ 4 ♀ (Brit. Mus. 1946.288,289).

## MOLUCCAS

Amboina, F. Muir, 1 ♀.

## WEST JAVA

From *Pipistrellus javanicus javanicus*, G. C. Shortridge, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

## PHILIPPINES

Pagsayan Falls, Luzon, from *Miniopterus schreibersi eschscholtzii* or *Tadarida plicata luzona*, Jan. 1923, E. H. Taylor, N. C. Rothschild, 1 ♂ 1 ♀.

## FORMOSA

Tainan, from *Miniopterus schreibersi*, Oct. 1906, 1 ♂, type of *N. sauteri* Scott.

Same data, circ. 20 ♂ ♀ (Brit. Mus. 1913.489; 1922.313).

## OTHER MATERIAL EXAMINED

## JAPAN

Wakayama, Honshu, from *Miniopterus schreibersi fuliginosus*, May 1934, Tokuda, 2 ♀.

HOST SYNONYMY

Name on original label	Current name
<i>Miniopterus blepotis japoniae</i> Thomas.	<i>M. schreibersi fuliginosus</i> Hodgson.
<i>Miniopterus eschscholtzii</i> Waterhouse.	<i>M. schreibersi eschscholtzii</i> Waterhouse.
<i>Miniopterus fuliginosus</i> Hodgson.	<i>M. schreibersi fuliginosus</i> Hodgson.
<i>Pipistrellus tralatitius tralatitius</i> Thomas.	<i>P. javanicus javanicus</i> Gray.
<i>Chaerephon luzonns</i> Hollister.	<i>Tadarida plicata luzona</i> (Hollister).

**Nycteribia parvuloides** Theodor, 1963

(Figs. 105, 111, 112)

*Nycteribia parvuloides*. Theodor, 1963, *Fieldiana, Zoology*, **42**, 151.

In most characters resembling *N. parvula*, differing as follows:

*Male*. The aedeagus is short, with a thick base and has a downwardly pointing, sharp end.

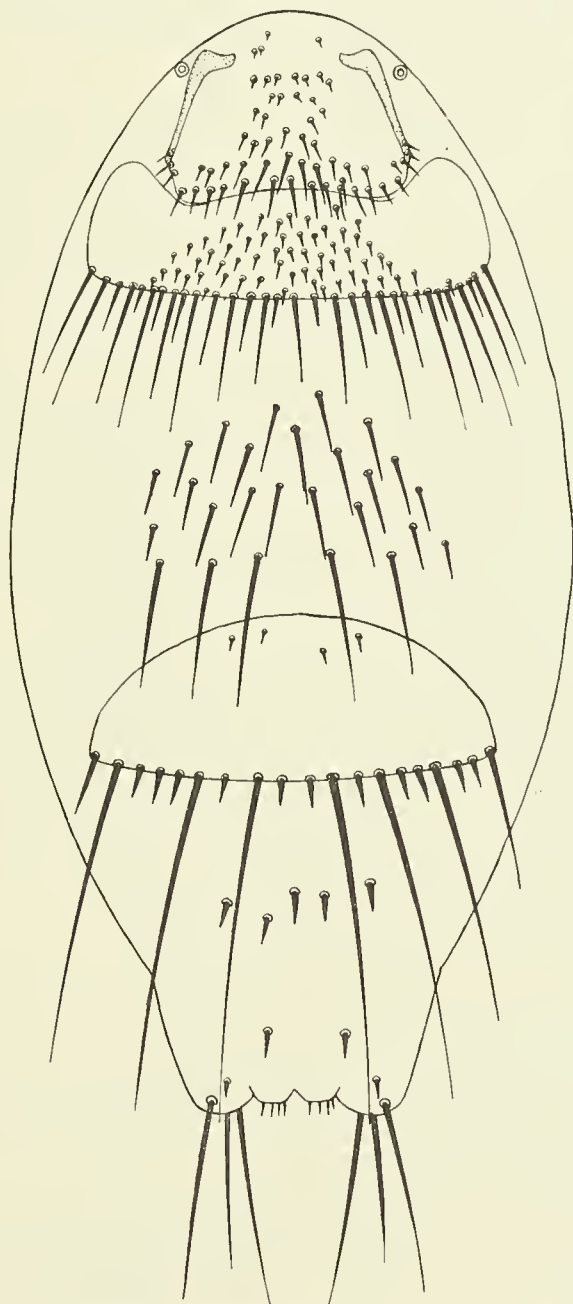


Fig. 112. *Nycteribia parvuloides* Theodor. Female, abdomen, dorsal.



# NYCTERIBIINAE

# NYCTERIBIA

The parameres are triangular, with a pointed end and minute hairs along the dorsal edge which have vertical bases, not oblique as in *N. parvula*.

*Female*. The hairs at the posterior margin of tergite 1 are much shorter than in *N. parvula*. Tergite 6 has 6 long setae. Sternite 7 has 2 long setae near the middle of the hind margin and 4–6 shorter setae lateral to them. Dorsal genital plate very small and shallow, ventral plate absent.

Distribution: Philippines, Burma, Nicobar Islands.

Type series in the Chicago Natural History Museum.

## MATERIAL IN THE COLLECTION

### BURMA

Fort Ava near Mandalay, from *Miniopterus* sp., 22.xi. 1937, G. Heinrich, 2 ♀ (Brit. Mus. 1946.288, 289).

### NICOBAR ISLANDS

From *Miniopterus australis pusillus*, J. G. Man, 1 ♂ 1 ♀ (Brit. Mus. 1911.103).

## HOST SYNONYMY

*Name on original label*  
*Miniopterus pusillus* Dobson.

*Current name*  
*M. australis pusillus* Dobson.

## Nycteribia pedicularia Latreille, 1805

(Figs. 37–39, 113–115)

*Nycteribia pedicularia*. Latreille, 1805, *Hist. Nat. Crust. & Insect.* **14**, 403.

*Nycteribia pedicularia* Latreille. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Nycteribia pedicularia* Latreille. Speiser, 1901, *Arch. Naturgesch.* **67**, 11 (pro parte, the record from Kapland refers to *N. capensis* Karaman).

*Nycteribia pedicularia* Latreille. Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 522.

*Nycteribia pedicularia* Latreille. Falcoz, 1924, *Bull. Mus. Hist. Nat.* **30**, 223.

*Nycteribia pedicularia* Latreille. Falcoz, 1926, *Diptères Pupipares, Faune de France*, **14**, Paris.

*Nycteribia pedicularia* Latreille. Gil Collado, 1932, *Eos*, **8**, 29.

*Listropodia pedicularia* (Latreille). Corradetti, 1934, *Riv. Malariol.* **13**, 338.

*Nycteribia pedicularia* Latreille. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, **17**, 9.

*Listropodia pedicularia* (Latreille). Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Listropodia pedicularia* (Latreille). Saccà & Bettini, 1949, *Riv. Parassit.* **10**, 1.

*Nycteribia pedicularia* Latreille. Aellen, 1952, *Bull. Soc. Sci. Nat. Maroc.* **31**, 149.

*Nycteribia pedicularia* Latreille. Aellen, 1955, *Bull. Soc. Neuchâtel Sci. Nat.* **78**, 81.

*Nycteribia pedicularia* Latreille. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.

*Nycteribia pedicularia* Latreille. Theodor, 1954, in Lindner, *Fliegen der Palaearkt. Region*, **66a**, 19.

*Nycteribia pedicularia* Latreille. Balcells, 1956, *Speleon*, **6**, 287.

*Nycteribia pedicularia* Latreille. Hurka, 1958, *Fol. Zool.* **7**, 231.

nec *Nycteribia pedicularia* Latreille. Scott, 1913, *Arch. Naturgesch.* **79**, 92 (refers to *N. formosana* Karaman).

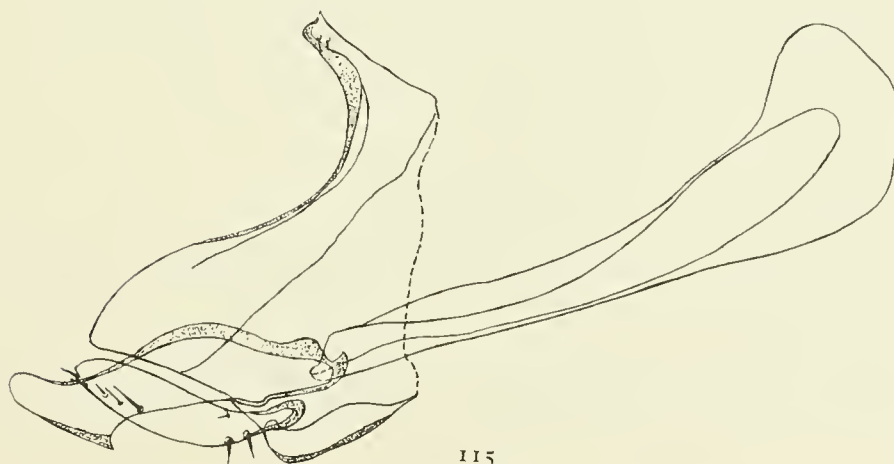
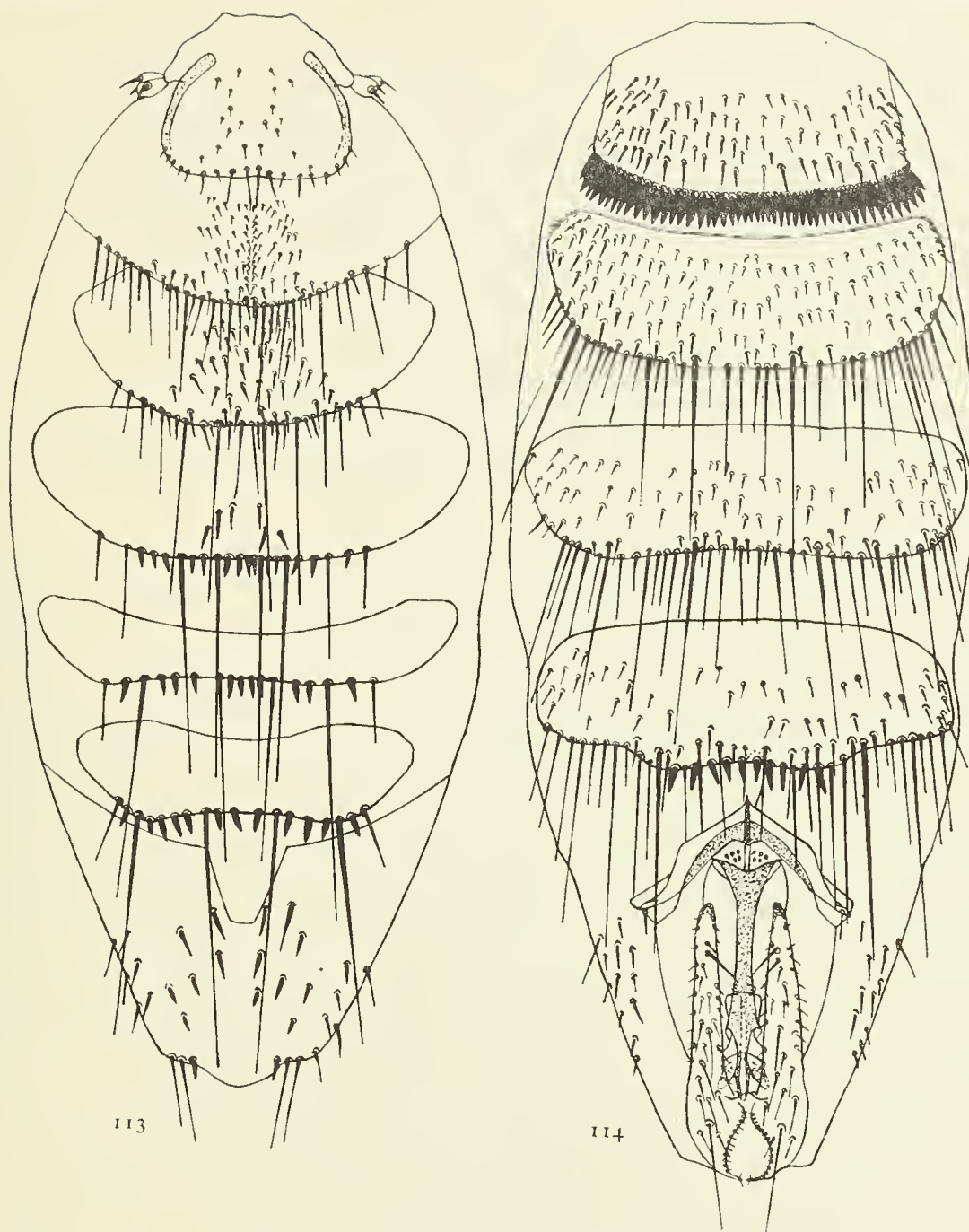
nec *Nycteribia pedicularia* Latreille. Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (refers to *N. dentata* n.sp. (Kashmir) and *N. formosana* Kar. (China)).

nec *Nycteribia pedicularia* Latreille. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479 (refers to *N. formosana* Karaman (China)).

nec *Nycteribia pedicularia* Latreille. Kishida, 1932, *Icon. Insect. Japon. Tokyo* (refers probably to *N. japonica* n.sp.).

Length 2.25–2.5 mm. *Head*. 2–4 short setae at the anterior dorsal margin. Labella of the proboscis as long as the theca.

*Thorax*. Wider than long. Length to width = 7 : 9. Oblique sutures forming an angle of



Figs. 113-115. *Nycteribia pedicularia* Latreille. Male. 113. abdomen, dorsal; 114. same, ventral; 115. genitalia.

90°. 6–9 notopleural setae. Tibiae with 3 rows of setae in the distal half of the ventral edge, 2.25 times as long as wide.

*Male abdomen.* Post-spiracular sclerite narrow, curved, with several setae. Tergite 1 with a row of short hairs posteriorly. Tergites 2 and 3 with marginal rows of longer and shorter setae and short hairs in the middle of the surface. Tergites 4–6 with marginal rows of longer setae and short spines between them, bare on the surface, except for a few hairs on tergite 4 in some specimens. Sternite 1 + 2 with a ctenidium of about 50 spines. Sternites 3 and 4 with marginal rows of long and short setae and short hairs on the surface. Sternite 5 with a group of 9–12 spines in the middle of the posterior margin in most specimens. (Rarely 7–8 or 13–14.)

*Genitalia.* Claspers straight, with dark blunt tips. A long seta dorsally near the base, some longer setae in the basal half and shorter setae apically. Phallobase with a marked bulge dorsally. Aedeagus short, with a rounded tip and a ventral tooth at the distal third. Parameres with blunt tip and a few hairs apically and near the base.

*Female abdomen.* Tergite 1 as in the male. Tergite 2 with a marginal row of 5–6 long setae in the middle and shorter setae and spines between the long setae and laterally. The tergite is broadly rounded and shorter in the middle than the width of tergite 1. Surface covered with short hairs in the middle. Connexivum between tergites 2 and 6 covered with short hairs, the last row consisting of longer setae. These short hairs are restricted to the area between the tergites and do not extend to the pleurae in most specimens. In some specimens short hairs extend to the pleurae from the ventral side, leaving only a narrow space between them and the dorsal group. Tergite 6 wide, bare on the surface, with 6–8 long setae in the marginal row and about 15 spines between them in groups of 1 to 6. Anal segment with short setae in the posterior part of the dorsal surface and longer setae at the posterior processes. Sternite 1 + 2 as in the male. Sternites 3 and 4 membranous, with marginal rows of longer and shorter setae. Surface of sternite 3 covered with short hairs, only 2–3 rows on sternite 4. Sternite 5 with 2 lateral sclerites with a double row of longer and shorter setae posteriorly. 4–5 setae between the sclerites. Sternite 6 similar, but the sclerites are larger and reach close to the midline. No setae between them. Sternite 7 triangular, with a double row of long and short setae laterally and only a single row in the middle. Dorsal genital plate triangular, with a row of about 12 short spines posteriorly. Ventral plate very narrow.

Distribution: Continental Europe, North Africa, West Asia. Records from Britain refer to *N. kolenatii*, from South Africa to *N. capensis*, from East Asia to *N. formosana* or *N. japonica* and the record from Kashmir to *N. dentata*. Many old records are doubtful as *N. pedicularia* was not differentiated from *N. kolenatii* and *N. latreillii* until recently.

#### MATERIAL IN THE COLLECTION

##### FRANCE

St G n ies de Malgoires, Gard, from *Myotis capaccinii*, 1911, and 24.ii. 1912, A. Hugues, N. C. Rothschild, 4 ♂ 3 ♀.

St G n ies de Malgoires, Gard, from *Rhinolophus hipposideros*, 1918, A. Hugues, N. C. Rothschild, 4 ♂ 1 ♀.

St G n ies de Malgoires, Gard, from *Rhinolophus ferrumequinum*, March 1932, A. Hugues, 1 ♀ (Brit. Mus. 1933. 263).

St G n ies de Malgoires, Gard, from *Miniopterus schreibersi*, Oct. 1926, A. Hugues, 1 ♂ 2 ♀.

Herauld, from *Rhinolophus* sp., Dec. 1926, N. C. Rothschild, 12 ♂ 7 ♀.



## NYCTERIBIINAE

### ITALY

- Isola Bella, Lago Maggiore, 16.viii. 1901, A. Ghidini, N. C. Rothschild, 7 ♂.  
 Bergamo, from *Myotis myotis*, i.vii. 1911, A. Ghidini, N. C. Rothschild, 1 ♀.  
 St Stefano, from *Myotis capaccinii*, 1915, N. Cimbali, N. C. Rothschild, 1 ♂ 4 ♀.  
 Toscana, from *Rhinolophus ferrumequinum*, 1915, N. Cimbali, N. C. Rothschild, 2 ♂.

### CORSICA

- Ajaccio, S. Hirst, 2 ♂ 1 ♀ (Brit. Mus. 1932. 487).

### SARDINIA

- Cagliari, from *Myotis capaccinii*, R. Meloni, N. C. Rothschild, 3 ♀.

### JUGOSLAVIA

- Vlaskopalje, Croatia, from bat, F. Dobiasek, N. C. Rothschild, 2 ♂ 1 ♀.

### ISRAEL

- Herzliya, from *Myotis* sp., 5.i. 1947, O. Theodor, 5 ♂ 5 ♀ (Brit. Mus. 1947. 277).

## NYCTERIBIA

### OTHER MATERIAL EXAMINED

Specimens from Germany, Austria, Bosnia, Turkey and Tunisia, all on various species of *Myotis*.

### *Nycteribia triangularis* n.sp.

(Figs. 116–119)

Length 2.5 mm. Colour brown. Head and thorax as in *N. pedicularia*. Thorax 1 mm. wide, 0.8 mm. long. 10–12 notopleural setae. Tibiae relatively slender, with tapering ends, 3 times as long as wide.

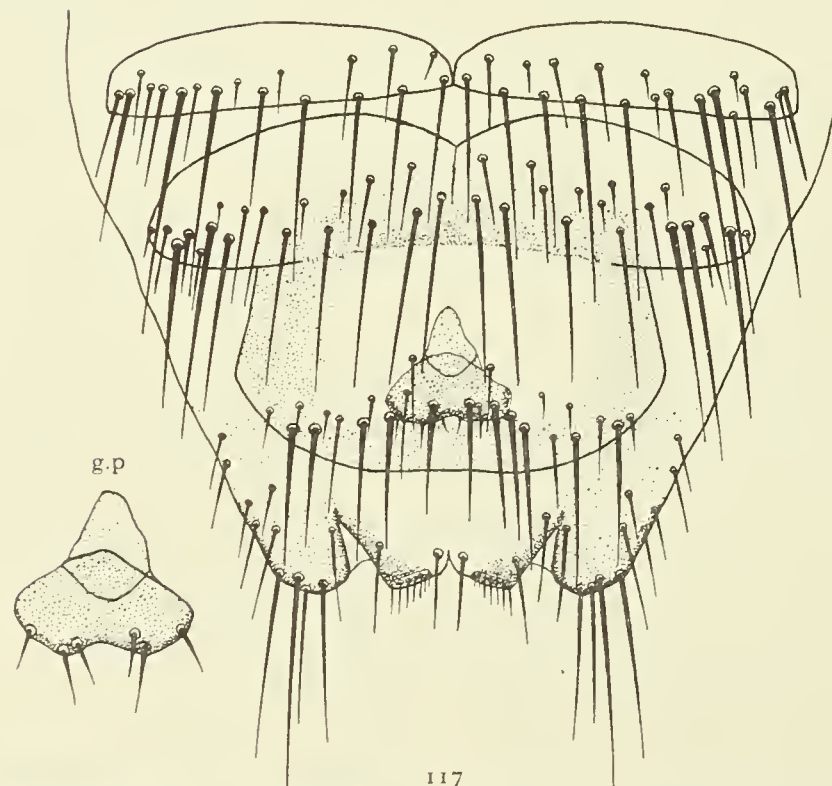
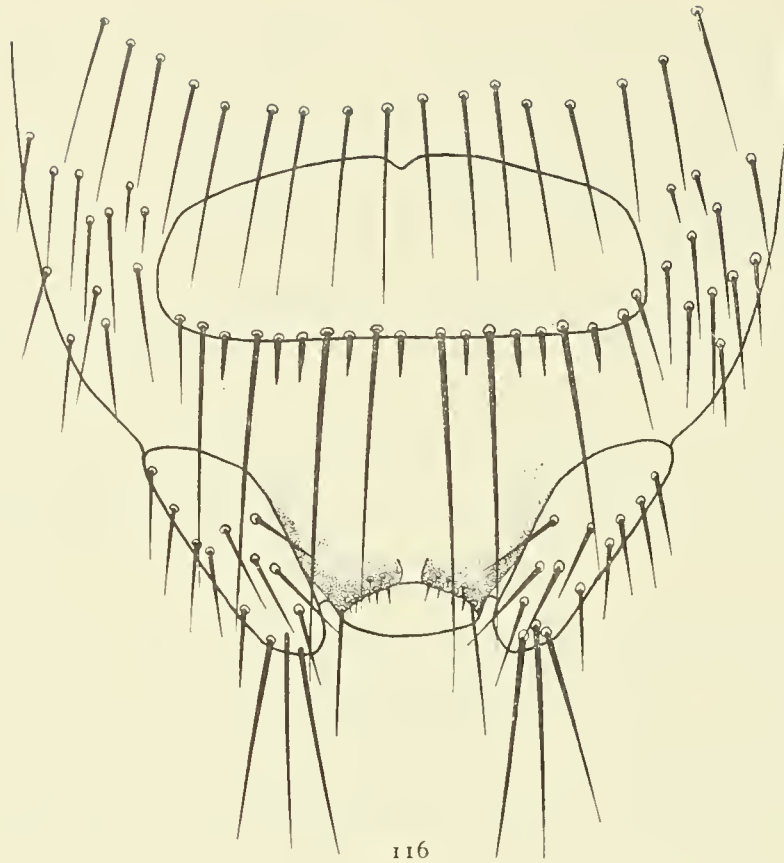
*Male abdomen.* Post-spiracular sclerite narrow, curved, with 6–8 long setae. Tergite 1 with a marginal row of short thin setae. Tergites 2–4 with groups of hairs on the surface which are much longer than in *N. pedicularia*. The group on tergite 4 consists of 25 rather long hairs, while in *N. pedicularia* this is either bare or has a few hairs. Sternite 5 with a row of 10–12 spines in the middle of the posterior margin, the median spines shorter than the lateral ones.

*Genitalia.* Phallobase conical, without dorsal bulge. Aedeagus slightly curved, with broadly rounded end and without ventral tooth, as wide at the apex as at the base. Parameres narrowly triangular, with pointed end and a few short hairs at the ventral margin.

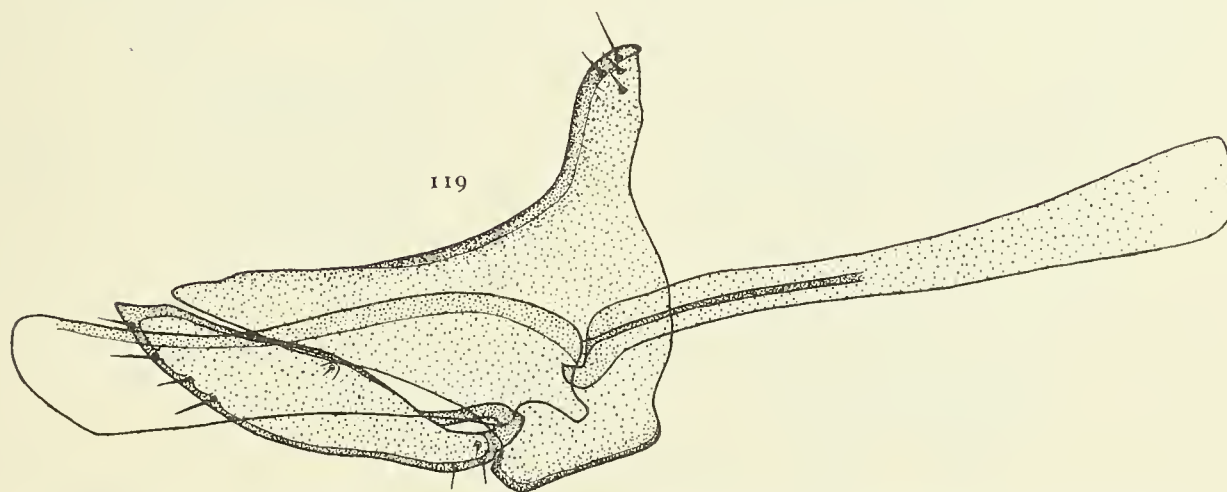
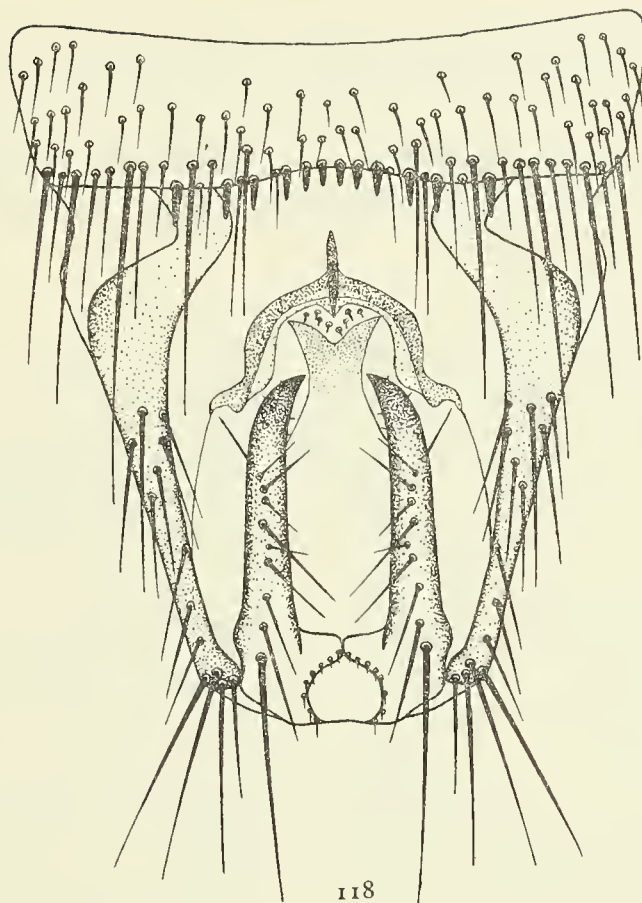
*Female abdomen.* Tergite 1 with 1–2 rows of minute hairs at the posterior margin. Tergite 2 short, with shallowly rounded posterior margin and a marginal row of moderately long setae alternating with short ones in the middle. A group of short hairs on the posterior part of the surface which does not reach the anterior margin. Distribution of hairs on the connexivum behind tergite 2 as in *N. pedicularia*, but, in addition, there is a group of setae at both sides of tergite 6. Anal segment very short, conical. Abdominal ctenidium with 60–70 spines. Sternite 6 incompletely divided, partly fused with sternite 7. Dorsal genital plate triangular, with 6–7 spines at the posterior margin. Ventral plate smaller, of irregular triangular shape.

This species is related to *N. pedicularia*, but differs from it in the male by the presence of hairs on tergite 4 and the structure of the genitalia, in the female in the chaetotaxy of the abdomen, the very short anal segment and the shape of the genital plate.

MALAYA. Selangor, from bat, 16.iii. 1953. ♂ holotype, 1 ♂ 2 ♀ paratypes in the U.S. National Museum, B-30032.



Figs. 116, 117. *Nycteribia triangularis* n.sp. Female. 116. abdomen, dorsal, posterior part; 117. same, ventral, and genital plates.



Figs. 118, 119. *Nycteribia triangularis* n.sp. Male. 118. sternite 5 and genital area; 119. genitalia.

*SCHMIDLII* GROUP

***Nycteribia capensis* (Karaman, 1939)**

(Figs. 120-123)

*Listropodia capensis*. Karaman, 1939, *Ann. Mus. Serb. merid.* 1, 31.

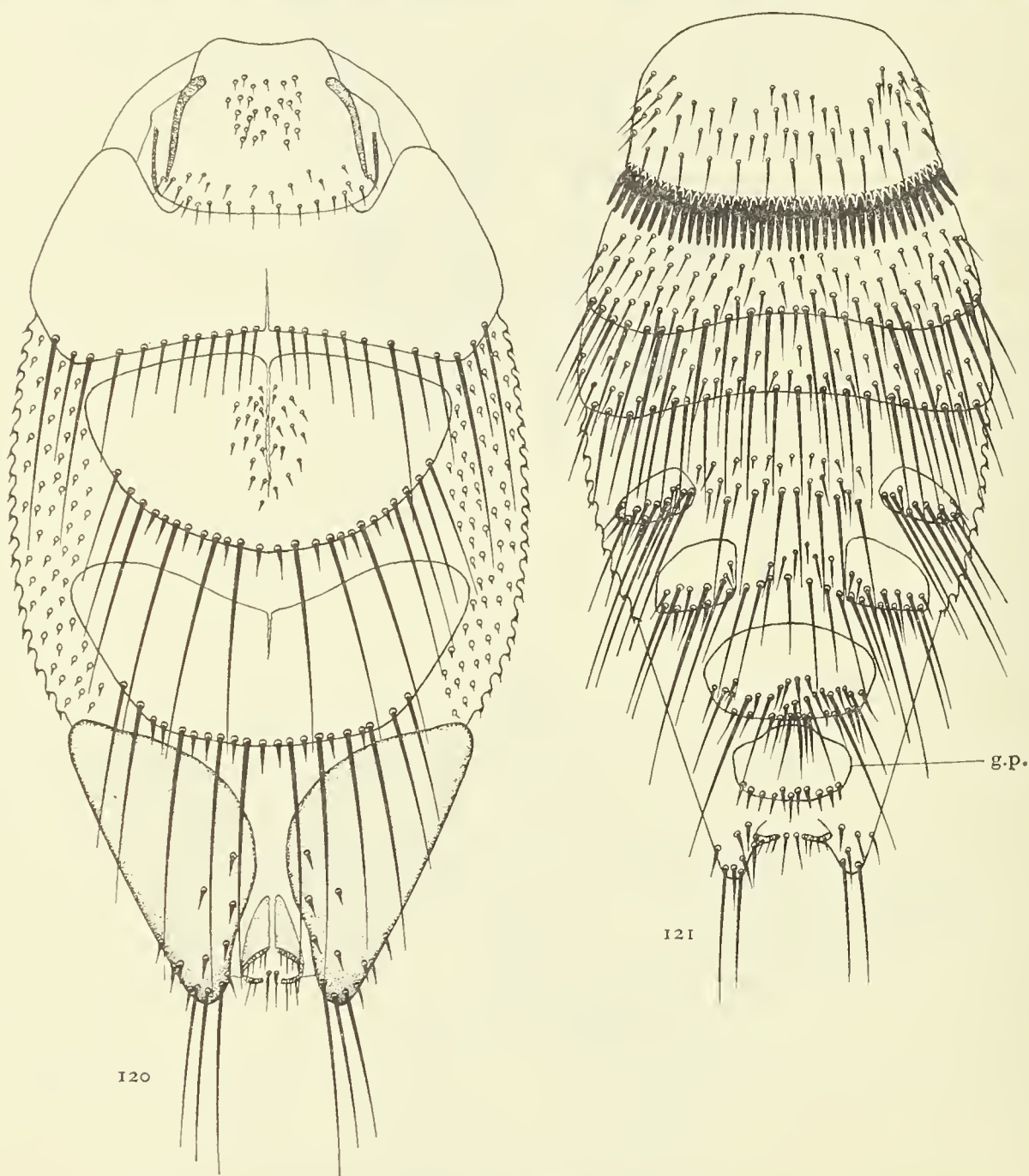
*Nycteribia pedicularia* Latreille. Speiser, 1901, *Arch. Naturgesch.* 67, 11 (South African record).

*Nycteribia capensis* Karaman. Theodor, 1957, *Parasitology*, 47, 457.



Length 2.5 mm. Head with 2 setae at the anterior dorsal margin. Genae with 6–8 short spines. Thorax wider than long. Length to width = 5 : 6. 8–10 notopleural setae. Tibiae 2.5 times as long as wide.

*Male abdomen.* Tergites 2–6 completely bare on the surface. The marginal row of tergite 2 consists of moderately long setae. 2–4 longer setae in the marginal row of tergite 3. The marginal

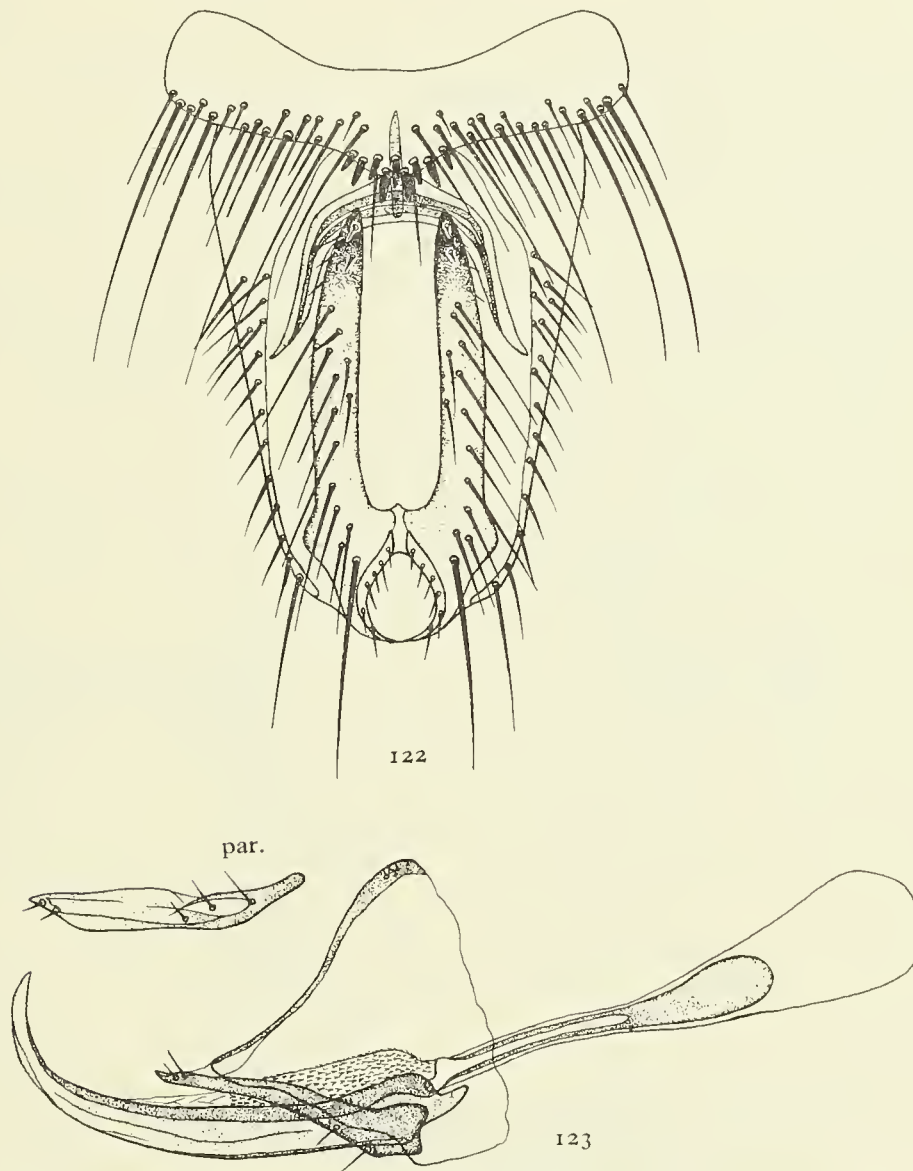


Figs. 120, 121. *Nycteribia capensis* (Karaman). Female. 120. abdomen, dorsal; 121. same, ventral.

rows of tergites 4–6 consist of about 6 very long setae alternating with spines. Anal segment conical, with short spines on the dorsal surface and 2–3 long setae posteriorly. Sternite 5 narrow, triangularly produced posteriorly in the middle, with a group of about 10 short, thick spines at the apex. The posterior spines in the middle are longer than the others.

*Genitalia.* Claspers thick, slightly curved, with blunt dark ends. Basal arc broadly rounded, with long anterior process. Phallobase concave dorsally. Aedeagus with long, upturned end, tapering to a point. Parameres narrow with rounded tip. Near the base, the dorsal membrane of the aedeagus is covered with minute scales.

*Female abdomen.* Tergite 1 with a double row of short setae near the margin. Tergal plate 2



Figs. 122, 123. *Nycteribia capensis* (Karaman). Male. 122. sternite 5 and genital area; 123. genitalia.

wide, short, surface bare, with a row of setae at the posterior margin which are shorter in the middle. Tergal plate 3 semicircular, with a marginal row of about 10–12 long setae alternating with spines; a small group of short hairs in the middle. Tergal plate 4 similar, surface bare, with a similar marginal row of 8–11 setae which is restricted to the middle. Anal segment large, conical, bare, except for 4–5 spines posteriorly and 3–4 setae at the anal processes. Pleurae covered with short, thick spines. Abdominal ctenidium with 40–44 spines. Sternite 5 with small, elliptical lateral sclerites with a double marginal row of longer and shorter setae. 5 long setae and

several short ones between the sclerites. Sternite 6 similar, but the sclerites are larger and placed more closely together. Sternite 7 undivided, with a double marginal row of moderately long setae and 2 longer setae laterally. Genital plate large, triangular or trapezoidal, with a row of 10–12 long spines posteriorly.

Distribution and hosts: South Africa, from *Myotis tricolor* and *Miniopterus schreibersi natalensis*.

***Nycteribia exacuta* Theodor, 1957**

(Figs. 124–127)

*Nycteribia exacuta*. Theodor, 1957, *Parasitology*, 47, 457.

Closely resembling *Nycteribia schmidlii scotti*, differing as follows:

*Male abdomen*. Sternite 5 short and rectangular with a median pointed process in the middle of the posterior margin which bears 6–8 short spines and there are a few such spines further

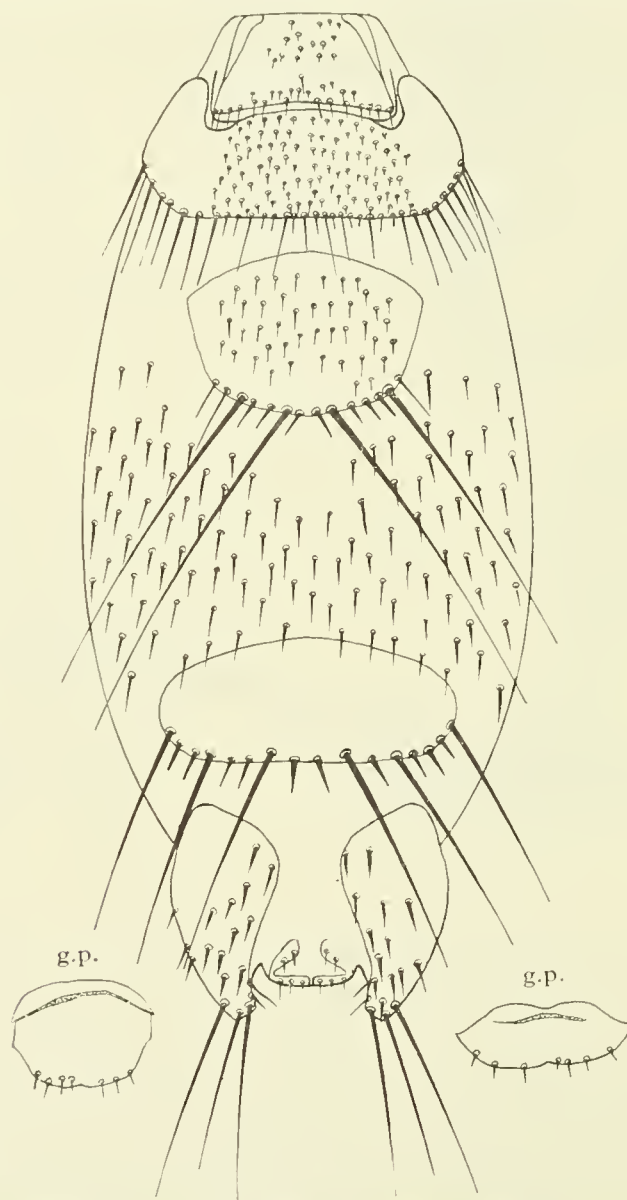
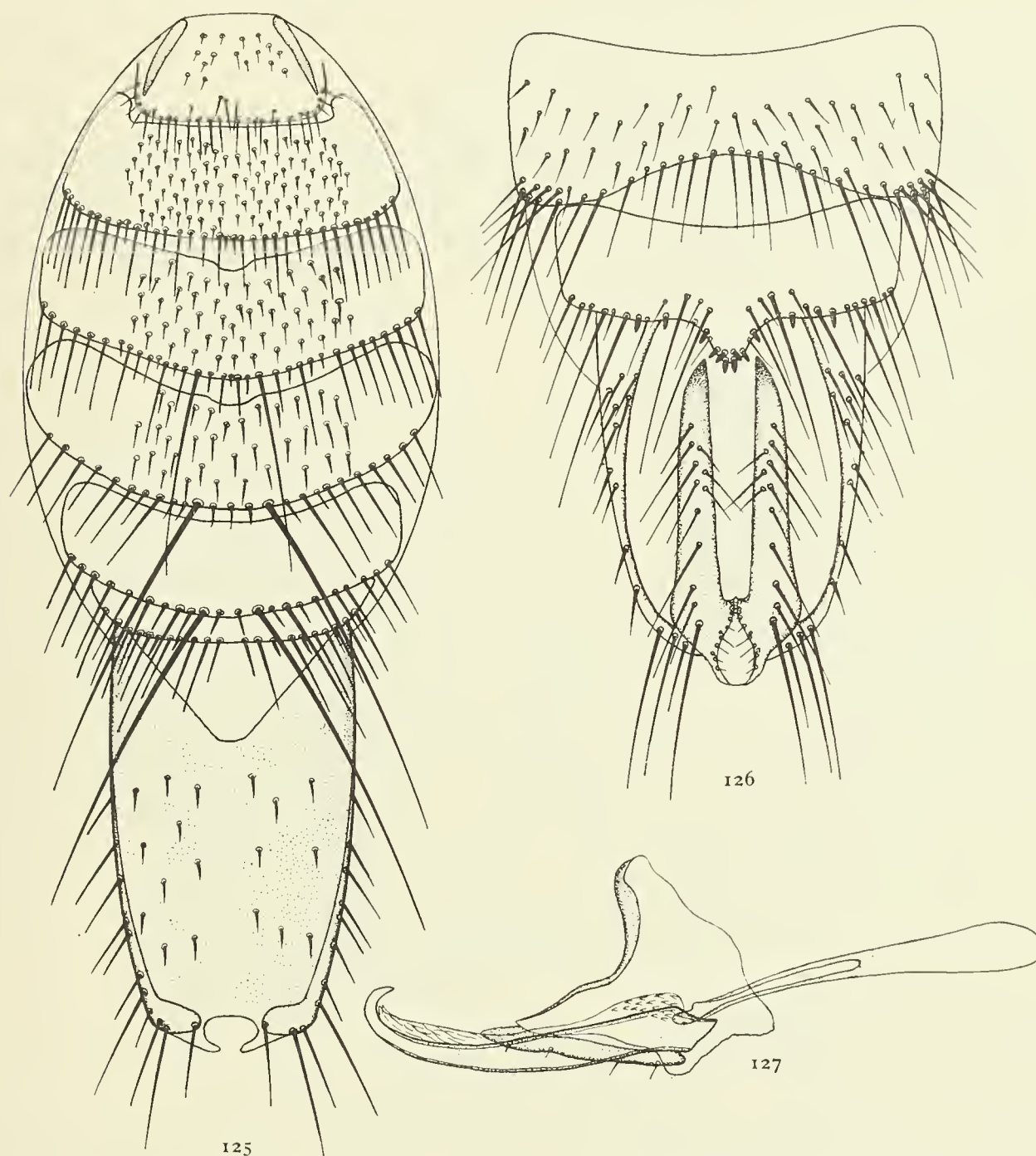


Fig. 124. *Nycteribia exacuta* Theodor. Female abdomen, dorsal, and genital plate (2 aspects).



laterally. Aedeagus uniformly tapering to a single long point which is curved backwards. The dorsal membrane of the aedeagus bears small scales near the base and its apical processes are narrower and shorter than in *N. schmidlii*.



Figs. 125-127. *Nycteribia exacuta* Theodor. Male. 125. abdomen, dorsal; 126. sternite 5 and genital area; 127. genitalia.

*Female abdomen.* Tergal plate 3 less wide than in *N. schmidlii scotti*, about half as wide as tergal plate 2. Genital plate rectangular, wider anteriorly; the posterior margin bears a row of 6-8 spines and the anterior margin is more strongly sclerotized.

Distribution and host: French Guinea, Dalaba, from *Miniopterus inflatus*.

Known only from the type series in the Muséum d'Histoire Naturelle, Geneva.

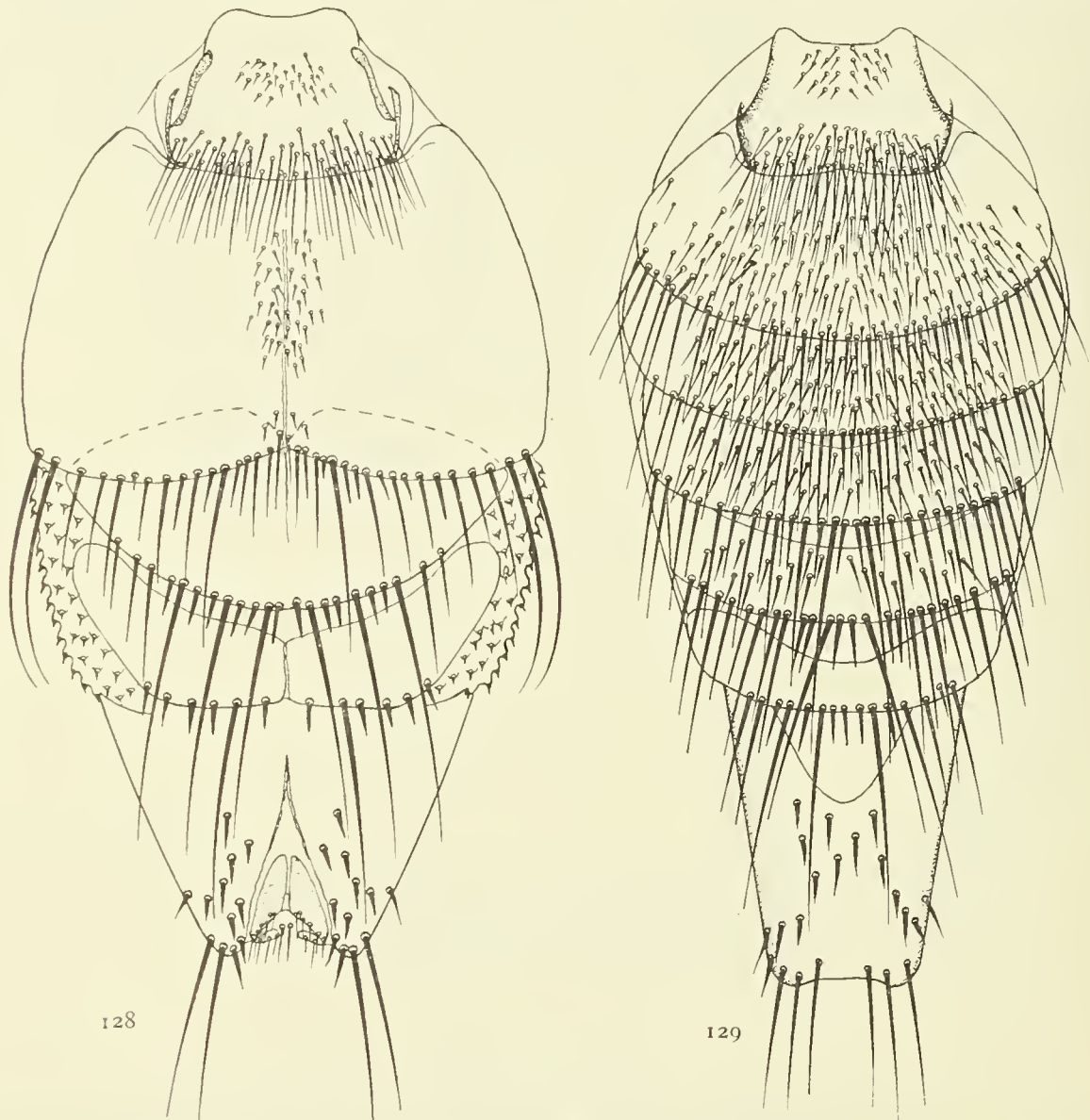
***Nycteribia latiterga* Theodor, 1957**

(Figs. 128–132)

*Nycteribia latiterga*. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2–2.3 mm. Head and thorax as in *N. capensis*.

*Male abdomen*. Tergites 2 and 3 with marginal rows of moderately long, thin setae. Nearly the whole surface covered with short hairs. Tergites 4–6 with marginal rows of 4–6 very long

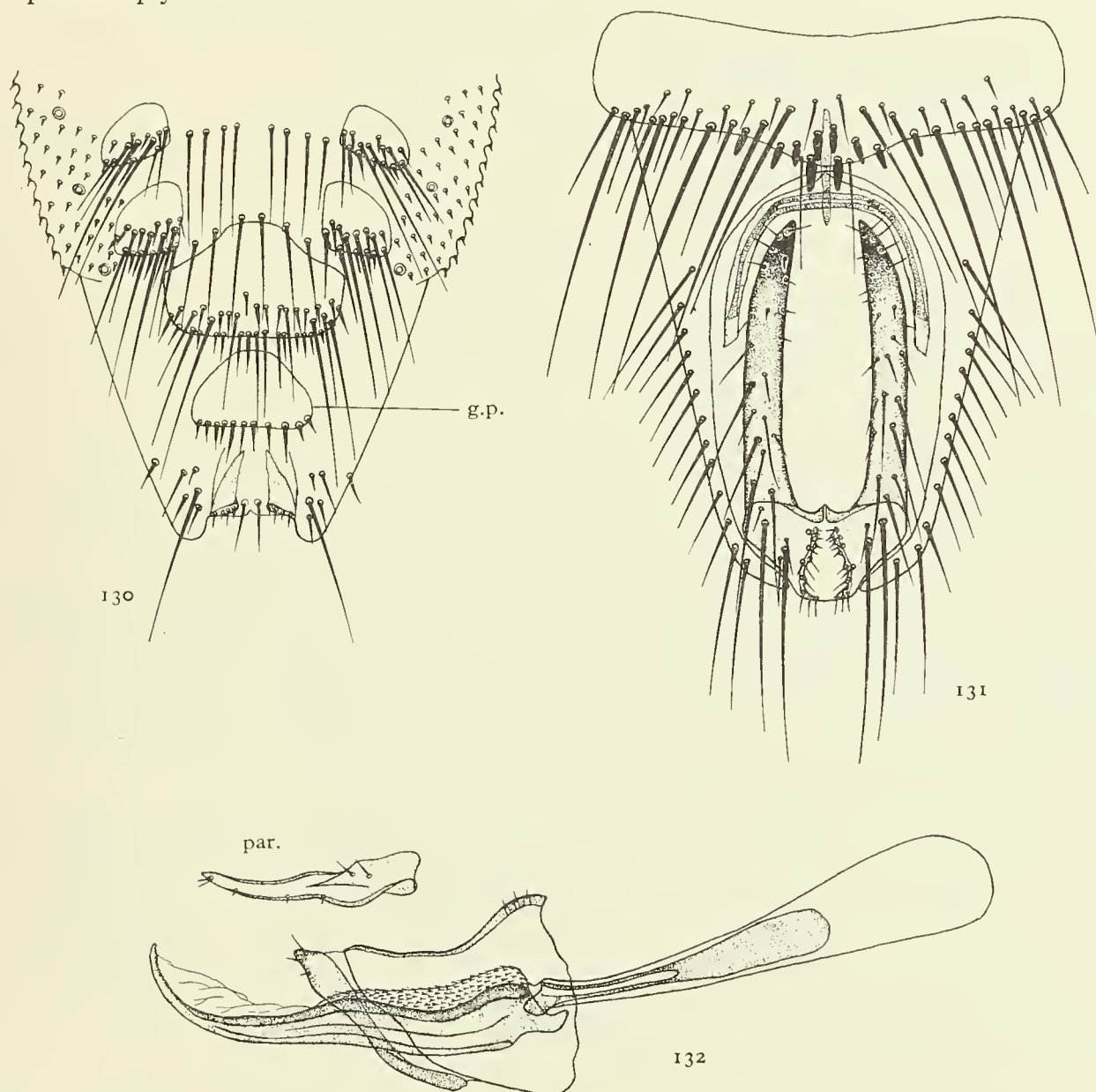


Figs. 128, 129. *Nycteribia latiterga* Theodor. 128. female abdomen, dorsal; 129. male abdomen, dorsal.

setae in the middle, alternating with groups of 2–3 spines and shorter setae laterally. The short hairs on tergite 4 are longer and less numerous than on tergite 3. Only a double row on tergite 5 and tergite 6 is bare. Anal segment narrow, nearly parallel-sided, as long as the preceding 3

tergites together. Sternite 5 similar to that of *N. capensis*, with 9–12 short spines in a double row at the apex. The median posterior spines longer than the others.

*Genitalia.* As in *N. capensis*, but the aedeagus is less curved, longer and has a dorsal bulge. It tapers sharply from the middle.



Figs. 130–132. *Nycteribia latiterga* Theodor. 130. female abdomen, ventral, posterior part; 131. male sternite 5 and genital area; 132. male genitalia.

*Female abdomen.* Tergite 1 with 3–4 rows of moderately long setae near the posterior margin. Tergal plate 2 very long, covering nearly half the dorsum. A small group of short hairs in the middle of the surface. The marginal row consists of 2–3 long setae laterally and shorter setae alternating with short spines in the middle. Tergal plate 3 semicircular, surface bare, with a marginal row consisting of about 6 long setae alternating with short spines. Tergal plate 4 similar, concave anteriorly, sometimes divided into lateral sclerites. Two long setae in the middle of the posterior margin and about 10 short spines. Anal segment broad, conical, bare dorsally



except for about 6–8 spines posteriorly and several long setae at the anal processes. Pleurae covered with short spines. Ventral surface similar to that of *N. capensis*. Genital plate large, triangular, with a row of 12–15 spines at the posterior margin.

Distribution: East Africa.

## MATERIAL IN THE COLLECTION

## KENYA

Mt Menengai near Nakuru, from *Miniopterus schreibersi arenarius* and *Myotis tricolor*, 8.vi. 1948, H. Hoogstraal, 2 ♂ 2 ♀ paratypes.

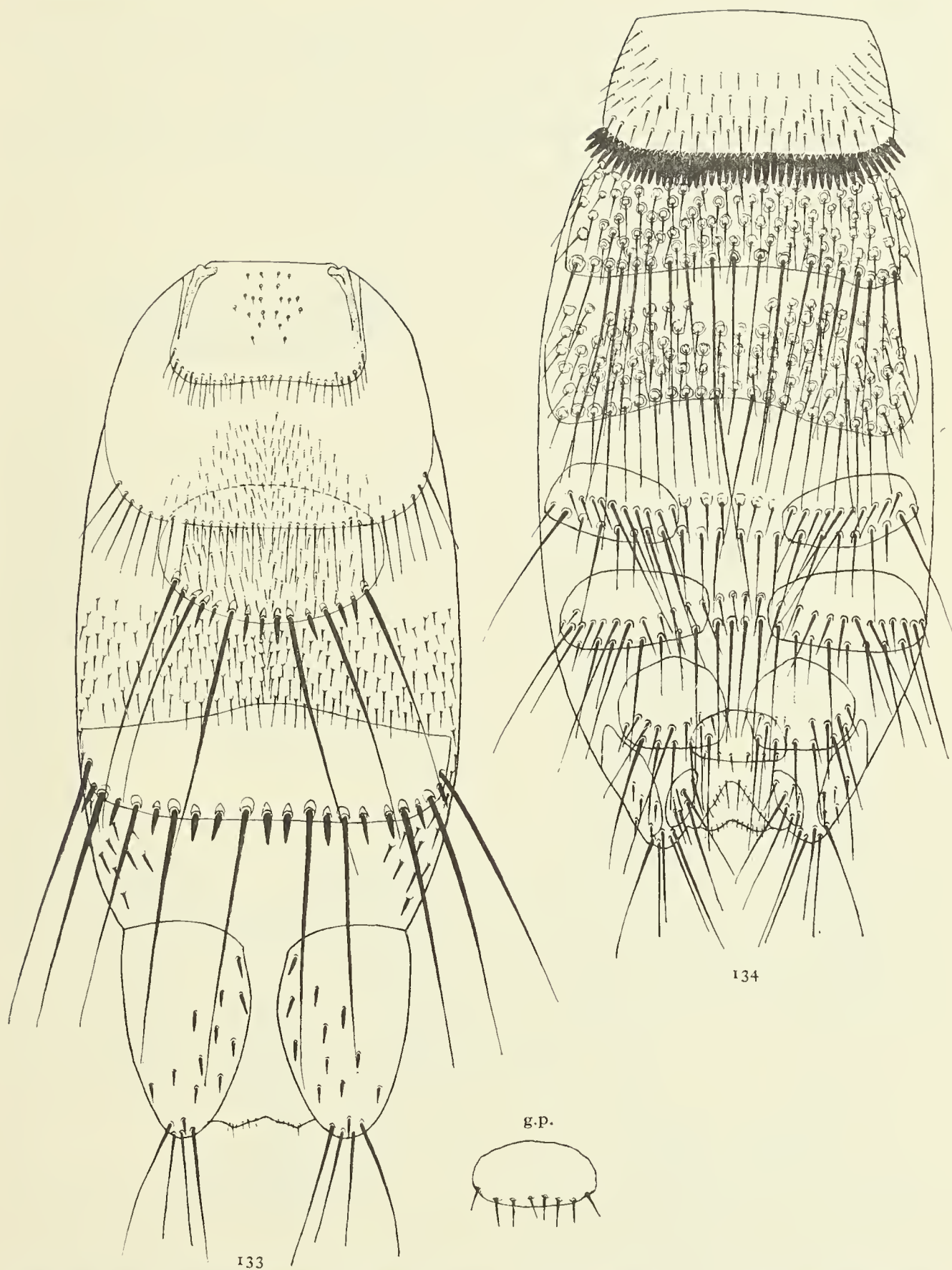
**Nycteribia schmidlii schmidlii** Schiner, 1853

(Figs. 133–138)

- Nycteribia schmidlii*. Schiner, 1853, *Verh. zool. bot. Verein, Wien*, **3**, 151.  
*Nycteribia blasii*. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.  
*Listropodia schmidlii* (sic) Schiner. Kolenati, 1857, *Wien. Ent. Monatsschr.* **1**, 52.  
*Listropodia schmidlii* Schiner. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.  
*Listropodia schmidtii* (sic) Schiner. Rondani, 1879, *Bull. Soc. Ent. Ital.* **11**, 6.  
*Nycteribia schmidlii* Schiner. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.  
*Nycteribia schmidlii* Schiner. Falcoz, 1923, *Arch. Zool. Exp. gen.* **61**, 522.  
*Nycteribia schmidlii* Schiner. Falcoz, 1924, *Bull. Mus. Hist. Nat.* **30**, 223.  
*Nycteribia schmidlii* Schiner. Falcoz, 1926, *Diptères Pupipares, Faune de France*, **14**, Paris.  
*Nycteribia schmidlii* Schiner. Falcoz, 1931, *Parasitology*, **23**, 264.  
*Nycteribia schmidlii* Schiner. Gil Collado, 1932, *Eos*, **8**, 29.  
*Listropodia schmidlii* Schiner. Corradetti, 1934, *Riv. Malar.* **13**, 338.  
*Listropodia schmidlii* Schiner. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, **17**, 9.  
*Listropodia schmidlii* Schiner. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.  
*Listropodia schmidlii* Schiner. Corradetti & Lupascu, 1941, *Riv. Parassit.* **5**, 85.  
*Listropodia schmidlii* Schiner. Stefanelli, 1942, *Riv. Parassit.* **6**, 1.  
*Listropodia schmidlii* Schiner. Saccà & Bettini, 1949, *Riv. Parassit.* **10**, no. 1.  
*Listropodia schmidlii* (sic) Schiner. Stefanelli, 1949, *Rend. Fac. Sci. Cagliari*, 181.  
*Nycteribia schmidlii* (sic) Schiner. Leclercq & Theodorides, 1950, *Ent. Monthl. Mag.* **86**, 74.  
*Nycteribia schmidlii* Schiner. Ricci, 1953, *Riv. Parassit.* **14**, 219.  
*Nycteribia schmidlii* Schiner. Aellen, 1952, *Bull. Soc. Sci. nat. Maroc.* **31**, 149.  
*Nycteribia schmidlii* Schiner. Aellen, 1955, *Bull. Soc. Neuchâtel Sci. nat.* **78**, 81.  
*Nycteribia schmidlii* Schiner. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.  
*Nycteribia schmidlii* Schiner. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 20.  
*Nycteriphila schmidlii* (Schiner). Grulich & Povolny, 1955, *Fol. Zool. Ent.* **4**, 111.  
*Nycteribia schmidlii* Schiner. Balcells, 1956, *Speleon*, **6**, 287.  
*Nycteribia schmidlii* Schiner. Hurka, 1958, *Fol. Zool.* **7**, 231.  
*Nycteribia schmidlii* Schiner. Aellen, 1959, *Rev. Suisse Zool.* **66**, 555.

Length 2–2.25 mm. *Head*. Setae at the anterior dorsal margin placed close together. Thorax as wide as long. Mesonotum narrow. 6–9 notopleural setae.

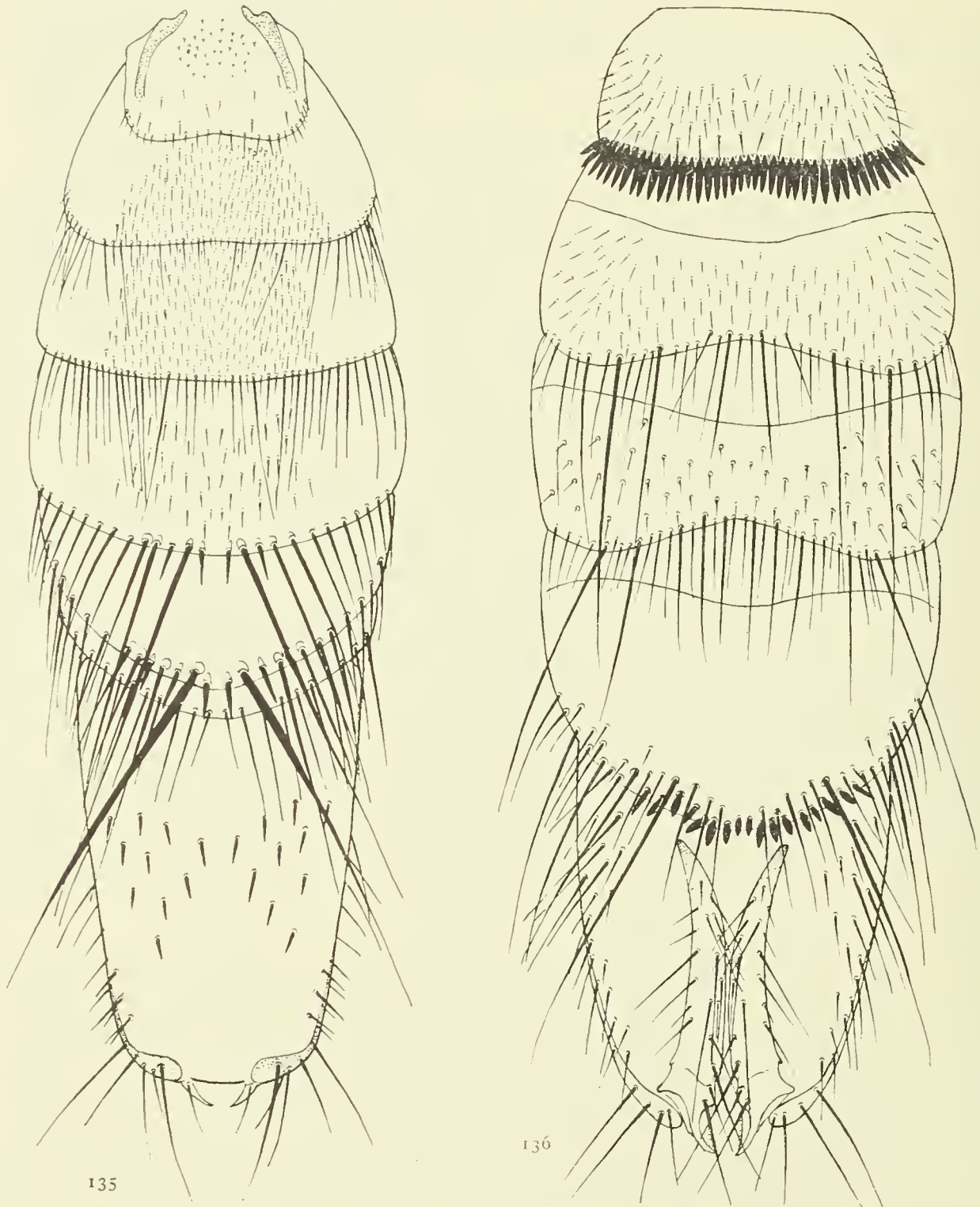
*Male abdomen*. Slender and narrow and held curved downwards. Tergites 1–4 with short hairs on the surface. Tergites 2–3 with moderately long setae in the marginal row. Tergite 4 more strongly convex posteriorly than tergite 3 and the hairs on the surface are longer. Marginal row with longer setae, particularly two in the middle very long. Tergite 5 similar, surface bare with 2–4 very long setae in the middle of the marginal row. Tergite 6 narrow, strip-like, bare, often covered by tergite 5. Its marginal row consists of moderately long, thin setae. Anal segment very long and slender, as long as the preceding 4 tergites together, nearly parallel-sided;



Figs. 133, 134. *Nycteribia schmidlii schmidlii* Schiner. Female abdomen. 133. dorsal, with genital plate; 134. ventral.

a group of spines in the middle of the dorsal surface. Sternite 1 + 2 with a ctenidium of 40-45 spines. Sternite 5 strongly convex posteriorly, bare, with a double row of 14-16 short, barrel-shaped spines at the posterior margin.

*Genitalia.* Basal arc narrow, with a long anterior process. Claspers curved, with dark points. Phallobase conical. Aedeagus long with a narrow, backwardly curved, bifid tip. Dorsal membrane

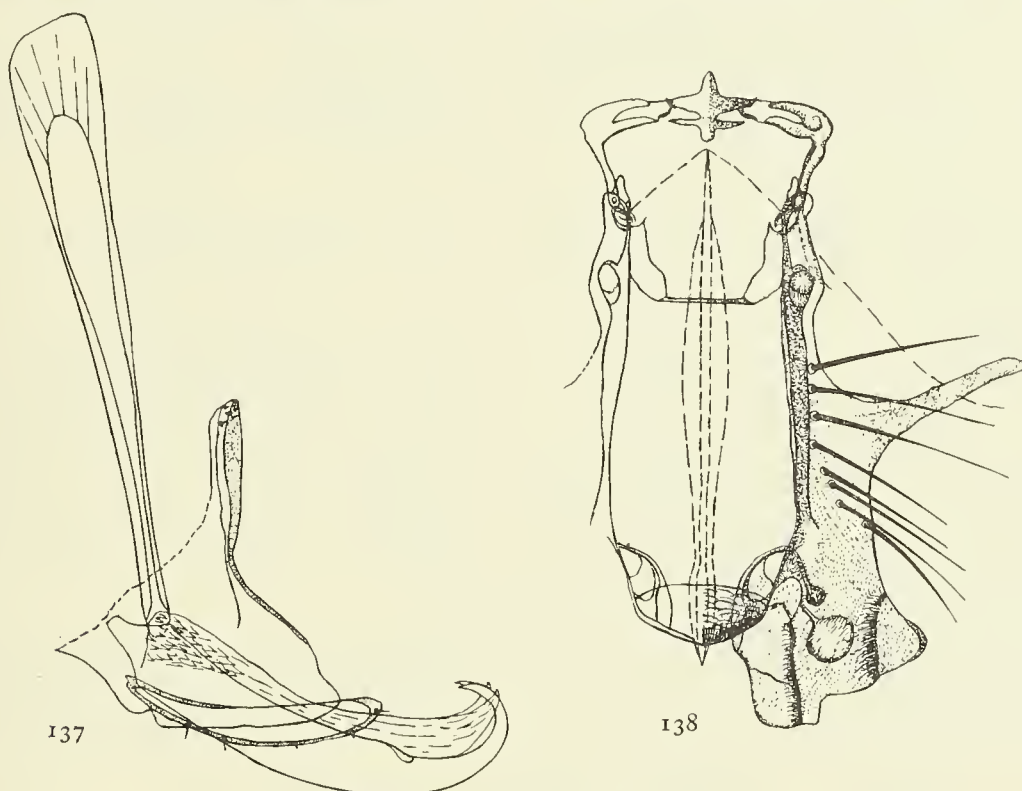


Figs. 135, 136. *Nycteribia schmidlii schmidlii* Schiner. Male abdomen. 135. dorsal; 136. ventral.



of the aedeagus with small, scale-like teeth in the basal half and ending in two pointed processes anteriorly. Parameres with rounded ends.

*Female abdomen.* Tergite 1 with short hairs posteriorly. Tergite 2 shorter or nearly as long as the width of tergite 1, with a nearly straight posterior margin with a row of moderately long, thin setae. A group of short hairs on the surface. Tergite 3 elliptical, narrower than tergite 2, with 6 very long setae and 8–10 spines at the posterior margin and short hairs on the surface. Tergite 6 short, wide, bare, with 8–10 long setae and 10–12 spines at the posterior margin. Connexivum



Figs. 137, 138. *Nycteribia schmidlii schmidlii* Schiner. 137. male genitalia; 138. thoracic pattern.

between tergites 3 and 6 covered with short hairs, sides of the abdomen bare. A group of spines laterally and posteriorly to tergite 6. Anal segment divided into two lobes with some spines on their median parts. Sternites 3 and 4 membranous with uniform marginal rows of moderately long setae and short hairs on the surface. Sternites 5 and 6 divided into elliptical sclerites with 2 rows of setae which continue in the space between the sclerites. Sternite 7 also divided into lateral sclerites which are placed close together. Dorsal genital plate elliptical with a row of 4–8 widely spaced hairs posteriorly. Ventral plate absent.

Distribution: Continental Europe, North Africa, West Asia.

#### MATERIAL IN THE COLLECTION

1 ♂ 1 ♀ under *N. mexicana* in coll. Bigot.  
10 specimens in original bottles, given by Kolenati  
(Brit. Mus. 1856.163).

#### FRANCE

Herault, from *Rhinolophus* sp., Dec. 1926, N. C. Rothschild, 20 ♂ 10 ♀.

St Génies de Malgoires, Gard, from *Myotis capaccinii*,  
1911, N. C. Rothschild, 5 ♂ 4 ♀. 24.ii. 1912,  
N. C. Rothschild, 4 ♂ 7 ♀. Mar. 1932, A. Hugues,  
3 ♀ (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Vespertilio murinus*, 25.iii. 1911, A. Hugues, N. C. Rothschild,  
17 ♂ 9 ♀.

## NYCTERIBIINAE

- St Génies de Malgoires, Gard, from *Rhinolophus hipposideros*, 1918, N. C. Rothschild, 7 ♀ 3 ♂.  
Mar. 1932, A. Hugues, 2 ♂ 1 ♀ (Brit. Mus. 1933. 263).  
St Génies de Malgoires, Gard, from *Rhinolophus euryale*, Mar. 1932, A. Hugues, 3 ♂ 2 ♀ (Brit. Mus. 1933. 263).  
St Génies de Malgoires, Gard, from *Rhinolophus ferrumequinum*, Apr. 1910, N. C. Rothschild, 3 ♂ 6 ♀. Mar. 1932, A. Hugues, 3 ♂ 1 ♀ (Brit. Mus. 1933. 263).  
St Génies de Malgoires, Gard, from *Miniopterus schreibersi*, 25.iii. 1911, N. C. Rothschild, 4 ♂ 5 ♀; 8.iv. 1923, N. C. Rothschild, 8 ♂ 7 ♀; 14.iii. 1926; 3 ♂ 4 ♀; Oct. 1926, 2 ♂ 4 ♀; Mar. 1932, 2 ♂ 1 ♀; A. Hugues (Brit. Mus. 1933. 263).

### GERMANY

- Taucha near Leipzig, from *Talpa europaea*, 27.xi.1913, O. Fritsch, N. C. Rothschild, 1 ♂ 1 ♀ (straggler).  
Taucha near Leipzig, from bats, 1913, O. Fritsch, N. C. Rothschild, 6 ♂ 3 ♀.  
Heidelberg, from *Miniopterus schreibersi*, 1 ♂ 1 ♀ (Brit. Mus. 1911.103).

### ITALY

- Spezia, from *Miniopterus schreibersi*, Marchese G. Doria, N. C. Rothschild, 4 ♂ 3 ♀ (Brit. Mus. 1913. 450).  
Toscana, from *Miniopterus schreibersi*, 1915, N. Cimbali, N. C. Rothschild, 4 ♂ 2 ♀.  
Toscana, from *Rhinolophus ferrumequinum*, 1915, N. Cimbali, N. C. Rothschild, 1 ♀.  
Massa Marittima, from *Rhinolophus euryale*, 1915, N. Cimbali, N. C. Rothschild, 1 ♀.  
Grosseto, from *Miniopterus schreibersi*, 1915, N. Cimbali, N. C. Rothschild, 1 ♀.

## NYCTERIBIA

- Florence, from *Vespertilio murinus*, 1915, N. Cimbali, N. C. Rothschild, 3 ♂ 1 ♀.  
Florence, from *Tadarida teniotis*, 1915, N. Cimbali, N. C. Rothschild, 1 ♀.

### ROUMANIA

- Maleoci, from *Plecotus auritus*, 17.i. 1908, A. Rettig, N. C. Rothschild, 11 ♂ 11 ♀.

### BULGARIA

- Strandja, from *Nyctalus* sp., 31.vii. 1925, G. Heinrich, 1 ♂ 7 ♀ (Brit. Mus. 1946. 288).

### BALEARIC ISLANDS

- Minorca, San Cristobal, from *Miniopterus schreibersi*, O. Thomas, R. J. Pocock, N. C. Rothschild, 3 ♂ 3 ♀ (Brit. Mus. 1913. 450).

### CRETE

- From *Miniopterus schreibersi*, Limnea, Frankfurt, 3 ♂ 2 ♀ (Brit. Mus. 1911.103).

### ALGERIA

- Sidi Okba near Biskra, from *Miniopterus schreibersi*, 1.iii. 1911, E. Hartert, C. Hilgert, pres. W. Rothschild, 7 ♂ 8 ♀.  
Oumash, near Biskra, from *Plecotus auritus christiei*, 5.iii. 1911, W. Rothschild, E. Hartert, N. C. Rothschild, 2 ♂ 3 ♀.  
Subterranean Lake, Hammam Meskoutine, from *Miniopterus schreibersi*, 1.iv. 1923, P. A. Buxton, 2 ♀.

### ISRAEL

- Rosh Pinna, from *Miniopterus schreibersi*, 21.xi. 1947, O. Theodor, 1 ♂ (Brit. Mus. 1947. 146).  
Herzliya, from *Miniopterus schreibersi*, 5.i. 1947, O. Theodor, 5 ♂ 5 ♀ (Brit. Mus. 1947. 277).

## OTHER MATERIAL EXAMINED

- Spain, from *Miniopterus schreibersi*. Dalmatia, from *Miniopterus schreibersi*. Morocco and Algeria, from *Rhinolophus ferrumequinum*. Antakya, Turkey, from *Rhinolophus ferrumequinum*. Cyprus, from *Rhinolophus euryale*.

## HOST SYNONYMY

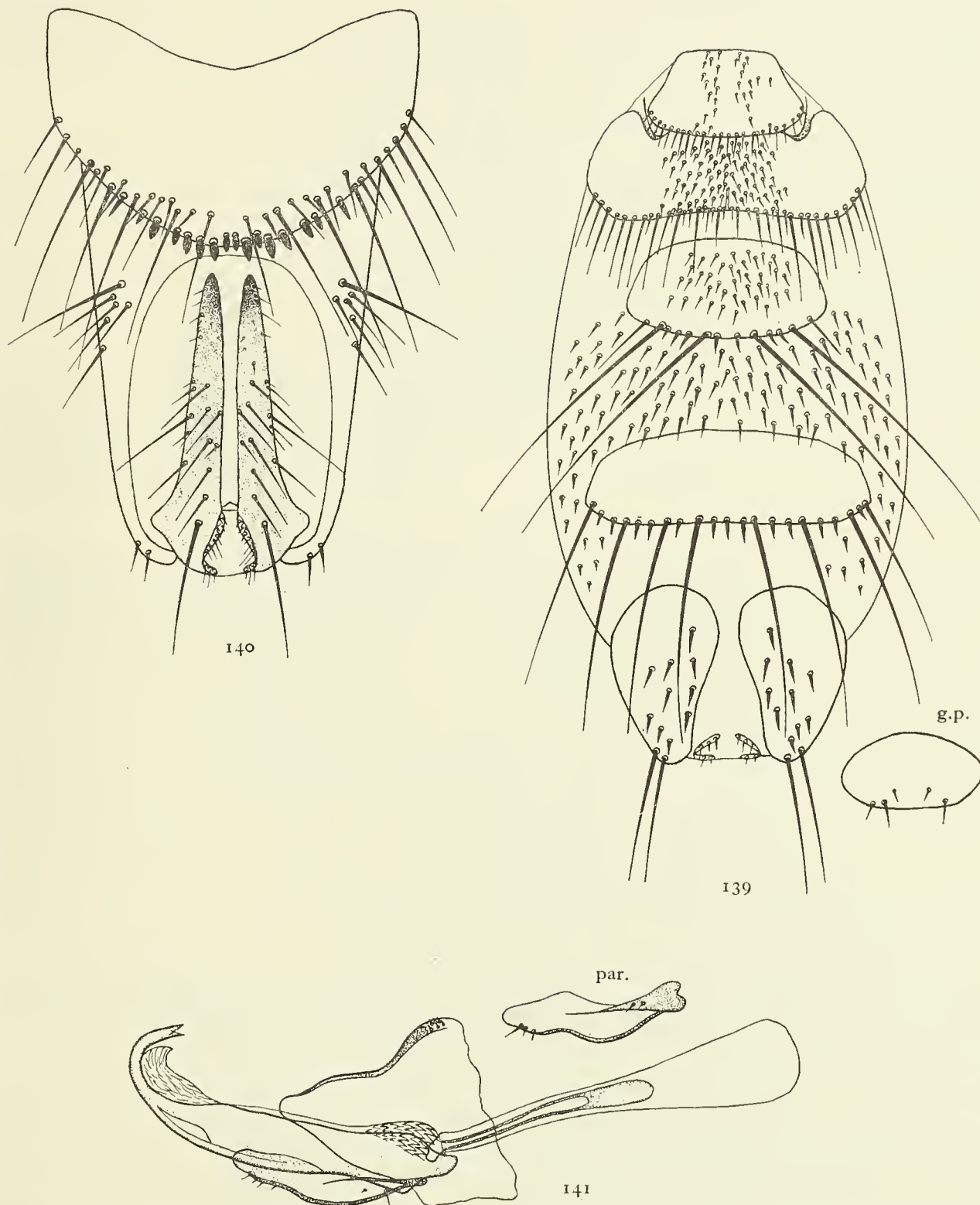
Name on original label	Current name
<i>Nyctinomus cestonii</i> Savi.	<i>Tadarida teniotis</i> Rafinesque.

## *Nycteribia schmidlii* scotti Falcoz, 1923

(Figs. 139-141)

- Nycteribia scotti*. Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 543.  
*Nycteribia schmidlii* Schiner. Zumpt, 1950, *Jour. Ent. Soc. South Africa*, **13**, 87.  
*Nycteribia schmidlii* Schiner. Aellen, 1952, *Mem. Soc. Neuchâtel Sci. nat.* **8**, 108.  
*Nycteribia schmidlii scotti* Falcoz. Theodor, 1957, *Parasitology*, **47**, 457.

The subspecies differs in minor chaetotactic characters from *N. s. schmidlii*. The short hairs on the surface of tergites 2-4 of the male abdomen are less numerous, shorter and thicker than in *N. s. schmidlii*, the scales on the dorsal membrane of the aedeagus are larger and less numerous. In the female, there are only 4 long setae in the marginal row of tergite 3 in most specimens, as



Figs. 139-141. *Nycteribia schmidlii scotti* Falcoz. 139. female abdomen, dorsal, and genital plate; 140. male sternite 5 and genital area; 141. male genitalia.

against 6-8 in *N. s. schmidlii* and 6-8 long setae on tergite 6 (about 10 in *N. s. schmidlii*). The genital plate has only 4-6 widely spaced, short and thin hairs posteriorly as against 6-8 longer hairs in *N. s. schmidlii*.



The subspecies replaces *N. s. schmidlii* in the whole of the Ethiopian region, including its Western parts and all records of *N. s. schmidlii* from Ethiopian Africa examined so far refer to this subspecies.

MATERIAL IN THE COLLECTION

SUDAN

Torit, Equatoria, from *Miniopterus* sp. no. 1831, Reid, 1 ♀.

NORTHERN RHODESIA

Mweru Lake, 1.x. 1935, G. A. H. Bedford, 1 ♂ 1 ♀ (Brit. Mus. 1931.414).

KENYA

Mt Elgon, Kenya side, from *Miniopterus schreibersi arenarius*, F. W. Edwards, 40 ♂ ♀ (Brit. Mus. 1935.203).

Kapretwa, Kitale, from *Miniopterus schreibersi arenarius*, Mar. 1938, G. H. E. Hopkins, 5 ♂ (Brit. Mus. 1938.298).

SOUTHERN RHODESIA

Mareppa Mine, Gwanda, from *Nycteris capensis*, R. Carruthers, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).

SOUTH AFRICA

Grahamstown, from *Rhinolophus capensis* or *Eptesicus capensis*, Jan. 1915, R. Graham, 2 ♀.

Onderstepoort, from *Miniopterus schreibersi natalensis*, Mar. 1927, G. H. A. Bedford, H. Scott, 3 ♂ 4 ♀.

Klein Windhoek, S.W. Africa, from *Miniopterus schreibersi natalensis*, 11.x. 1933, K. Jordan, 1 ♀.

CONGO

Thysville, from bat, July 1916, J. Bequaert, 1 ♀.

OTHER MATERIAL EXAMINED

Numerous specimens from the North-Eastern parts of the Congo and from Katanga, from *Miniopterus inflatus*, *M. minor*, *Hipposideros caffer*, from West Africa, from Nigeria, Cameroons and French Guinea, from *Miniopterus inflatus*, *Pipistrellus culex* and *P. nanus* and from many localities in South Africa from the hosts mentioned and from *Rhinolophus clivosus augur*.

HOST SYNONYMY

Name on the original label  
*Miniopterus natalensis arenarius* Heller.  
*Miniopterus natalensis* Smith.

Current name  
*M. schreibersi arenarius* Heller.  
*M. schreibersi natalensis* Smith.

**Nycteribia stylidiopsis** Speiser, 1908

(Figs. 142-147)

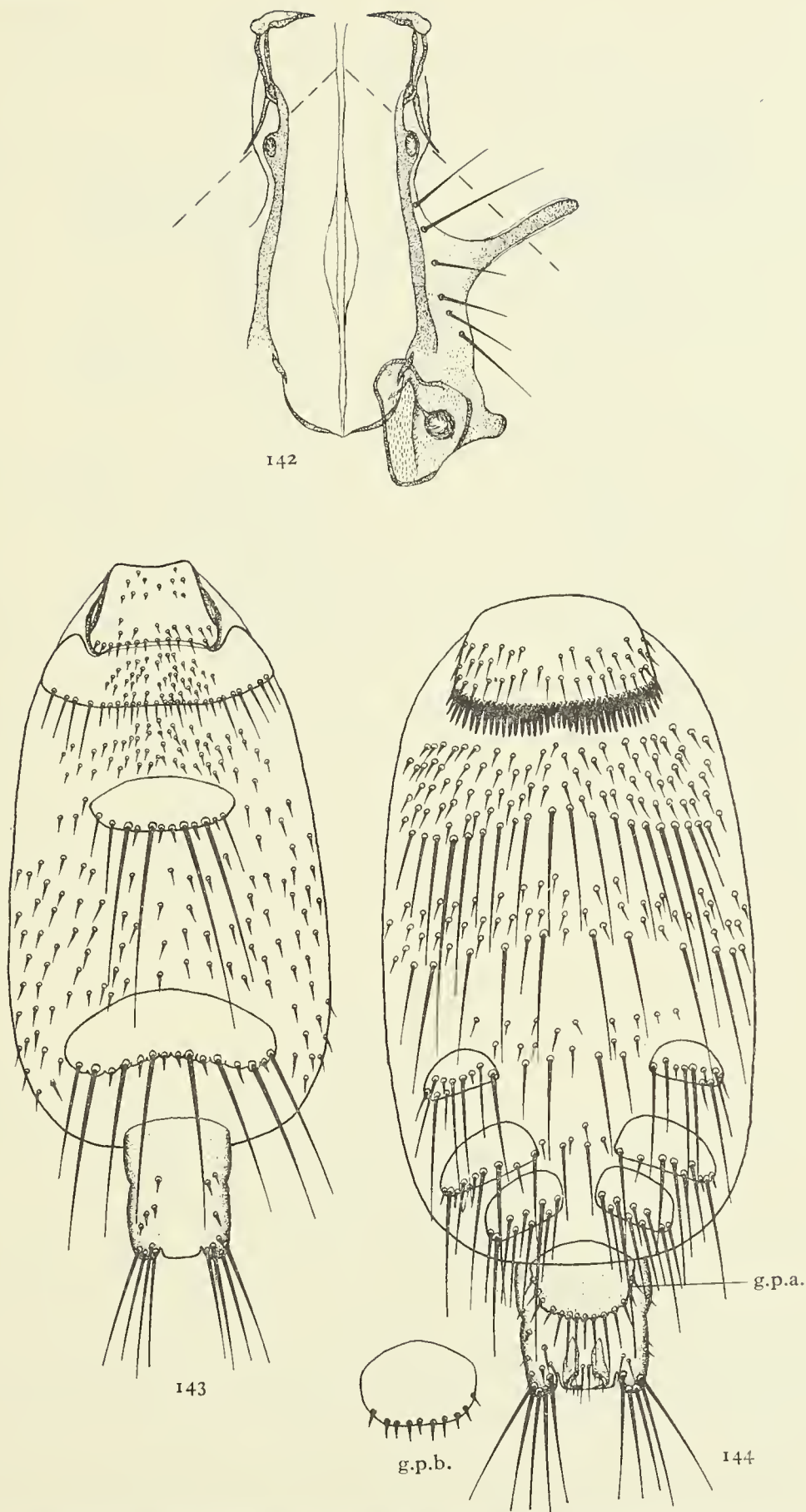
*Nycteribia stylidiopsis*. Speiser, 1908, *Voeltzkow, Reise in Ostafrika*, 2, 197.

*Nycteribia stylidiopsis* Speiser. Theodor, 1957, *Parasitology*, 47, 457.

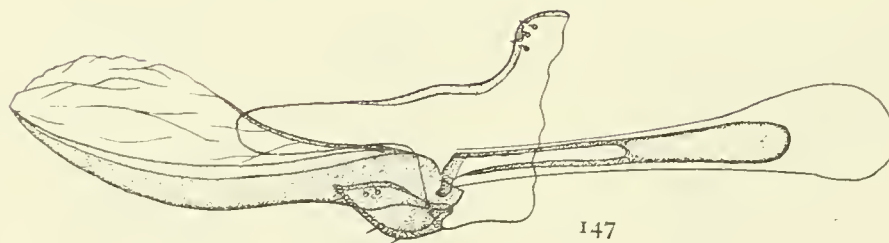
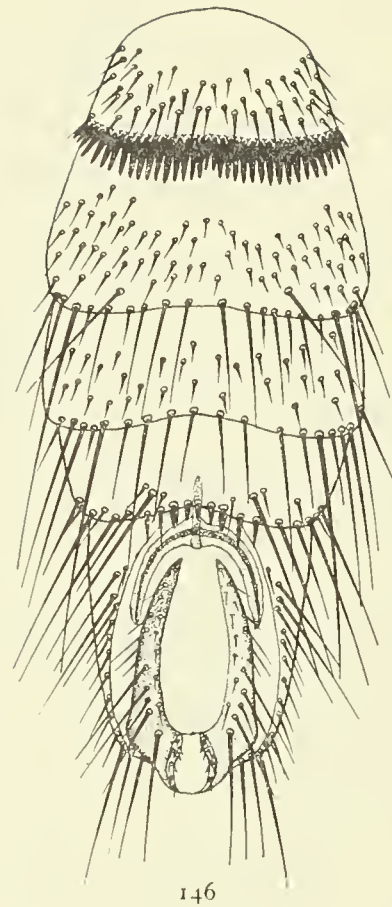
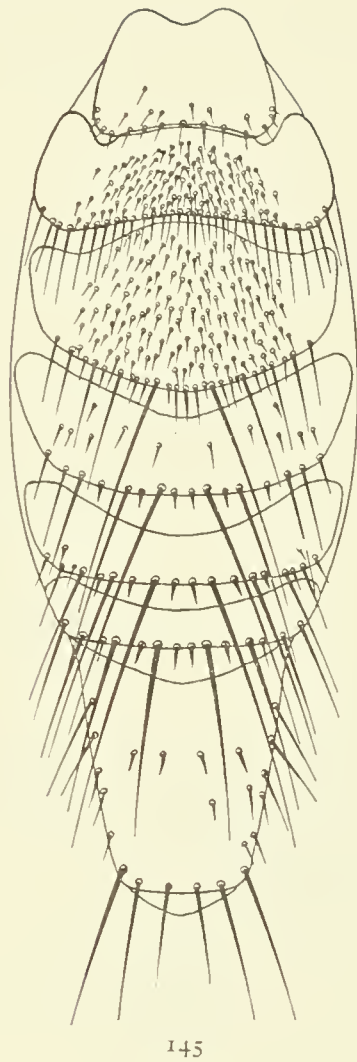
Length 2 mm. Head as in *N. capensis*. Thorax as long as wide. Oblique sutures forming an angle of 85°. 7-8 rather short and thin, notopleural setae reaching nearly to the anterior spiracle. Lateral plates of the notopleural sutures narrow. Tibiae 2.5 times as long as wide.

*Male abdomen*. Tergite 3 rather long, with a marginal row of setae of which 2 near the middle are very long. Tergites 4-6 very short, with marginal rows of long setae alternating with spines. The 4 median setae very long. Surface of tergites 2 and 3 covered with numerous short hairs, only 1-2 rows on tergite 4 and tergites 5 and 6 are bare. Anal segment conical, with a transverse row of spines in the middle. Sternite 5 short and narrow, with a group of 4-6 spines in the middle of the posterior margin.

*Genitalia*. Claspers short, slightly curved, with blunt ends. Basal arc rounded, with a long anterior process. Phallobase concave dorsally, prolonged into 2 long, rounded processes distally. Aedeagus slightly curved, tapering to a sharp point. Parameres very short, triangular, with a sharp distal end.



Figs. 142-144. *Nycteribia stylidiopsis* Speiser. 142. dorsal pattern of thorax; 143. female abdomen, dorsal; 144. same, ventral (g.p.a. genital plate with long setae, g.p.b. genital plate with short spines).



Figs. 145-147. *Nycteribia styliidiopsis* Speiser. Male. 145. abdomen, dorsal; 146. same, ventral; 147. genitalia.

*Female abdomen.* Tergite 1 with 2-3 rows of short hairs near the posterior margin. Tergal plate 2 very short, with a marginal row of longer setae laterally and shorter setae alternating with spines in the middle. A group of short hairs on the surface. Tergal plate 3 small, elliptical, surface bare, with a marginal row of 4 long setae alternating with short spines and 2 shorter setae laterally. Tergite 6 wider, rectangular, surface bare and with a marginal row of about 8



long setae alternating with spines. Dorsum between tergal plates 2 and 3 and between 3 and 4 covered with short hairs which are smaller and placed more closely between tergal plates 2 and 3. Anal segment very narrow, sharply set off from the abdomen, with a few spines dorsally and 4–5 setae at the anal processes. Sternite 1+2 narrow, with a ctenidium of about 40 spines. Sternites 5–7 divided into lateral sclerites with several setae between them on sternite 5, only 1 or 2 on sternite 6 and none on sternite 7. Genital plate lying further posteriorly than in other species, covering the basal half of the anal segment, semicircular, with a marginal row of 6–8 moderately long setae in the middle and shorter ones laterally. Anal sclerite absent, represented by 2 isolated setae.

Distribution: Madagascar.

#### MATERIAL IN THE COLLECTION

##### MADAGASCAR

Mt Ambre, from bats, 5.iii. 1951, R. Paulian, 1 ♂ 1 ♀.

Namarona, Ambohimiryia Cave, from *Pipistrellus nanus* and *Myotis goudotii*, Sept. 1952, R. Paulian, 1 ♂ 1 ♀.

#### PARILIS GROUP

This is a well-defined group of similar species which is distributed from the Moluccas to the New Hebrides. Small species, 1.5–2 mm. Mesonotum narrow. Tibia 3 much more slender than tibia 1.

*Male*. Sternite 5 with or without spines at the posterior margin. Claspers with a pronounced basal angle.

*Female*. 4 tergites on the abdomen before the anal segment. Anal segment short and wide, with a group of spines dorsally which is characteristic for the species. Sternites 7 and 8 either completely or incompletely fused, more or less triangular, with a characteristic armature of setae. Genital plates absent, apparently represented by sternite 8.

#### *Nycteribia parilis* Walker, 1861

(Figs. 148–151)

*Nycteribia parilis*. Walker, 1861, *Jour. Linn. Soc. Zool.* **5**, 300.

*Nycteribia parilis* Walker. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia tolisima*. Speiser (MS) in Muir, 1912, *Bull. Mus. comp. Zool.* **54**, 352.

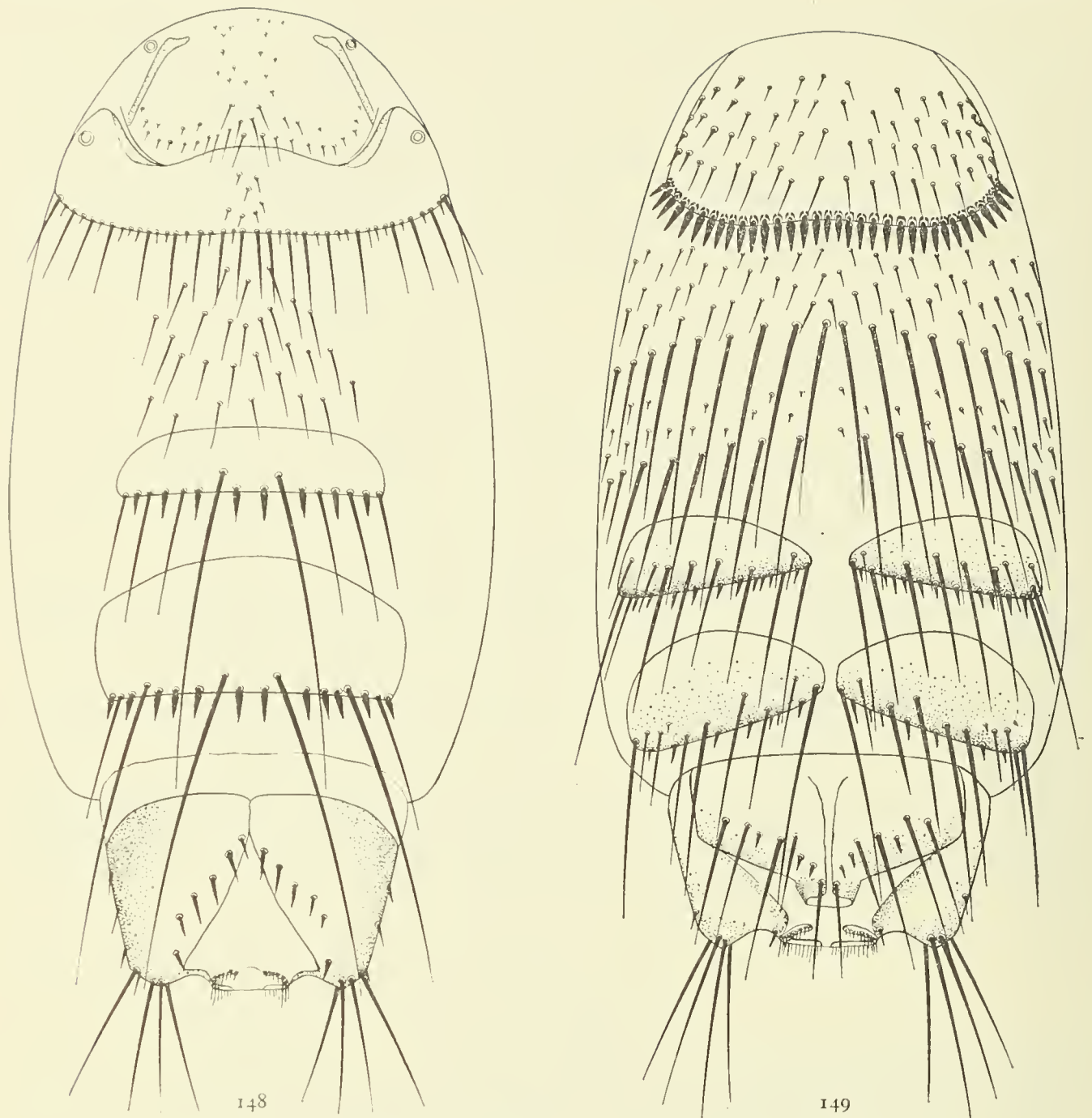
*Nycteribia parilis* Walker. Scott, 1914, *Ann. Mag. Nat. Hist.* ser. 8, **14**, 230.

Length 1.5–1.75 mm. Colour yellowish.

*Head*. 2 setae at the anterior dorsal margin. Palps slender, with a long terminal seta. Labella of the proboscis as long as the theca.

*Thorax*. Sternal plate as long as wide. Mesonotum narrow, 8–9 notopleural setae. Thoracic ctenidium with about 14 pointed spines. Oblique sutures forming an angle of slightly less than 90°. Posterior margin of sternal plate with 2 very long setae at the lateral bulges and some shorter setae. Tibia 1 twice as long as wide, hind tibia 2.5–3 times as long as wide. Tibia 2 intermediate.

*Male abdomen*. Post-spiracular sclerite slender, ribbon-shaped, with a long seta near the



Figs. 148, 149. *Nycteribia parilis* Walker. Female abdomen. 148. dorsal; 149. ventral.

spiracle and 1-3 shorter setae. Tergite 1 triangular, with 2 rows of short setae near the posterior margin, the median setae longer than the lateral ones. Tergite 2 short, with a marginal row of moderately long, thin setae, alternating with short spines and a group of about 20 hairs on the surface. Tergite 3 similar, but some setae in the middle of the hind margin are longer and the hairs on the surface are more numerous (30-40). Tergites 4-6 with 2 very long and strong setae near the middle of the hind margin and shorter setae laterally. Short thick spines in groups of 2-3 between the setae. About 15 hairs in 2-3 rows on tergite 4, tergites 5 and 6 bare. Anal segment truncate, nearly square, with a transverse curved row of short spines in the middle

and 4-5 long setae at the lateral posterior corners. Sternite 1+2 rectangular, with a ctenidium of about 35 spines which are shorter in the middle. 3-4 rows of short setae on the surface; those of the posterior row are longer, but do not reach the ctenidium. Sternites 3 and 4 with marginal rows of moderately long setae alternating with shorter ones. A premarginal row of long setae and 2-3 rows of short hairs on the surface. Sternite 5 with a marginal row of 3 long setae at each side and 4 shorter setae in the middle, short setae or long spines between the setae. The group



Fig. 150. *Nycteribia parilis* Walker. Male, sternite 5 and genital area.

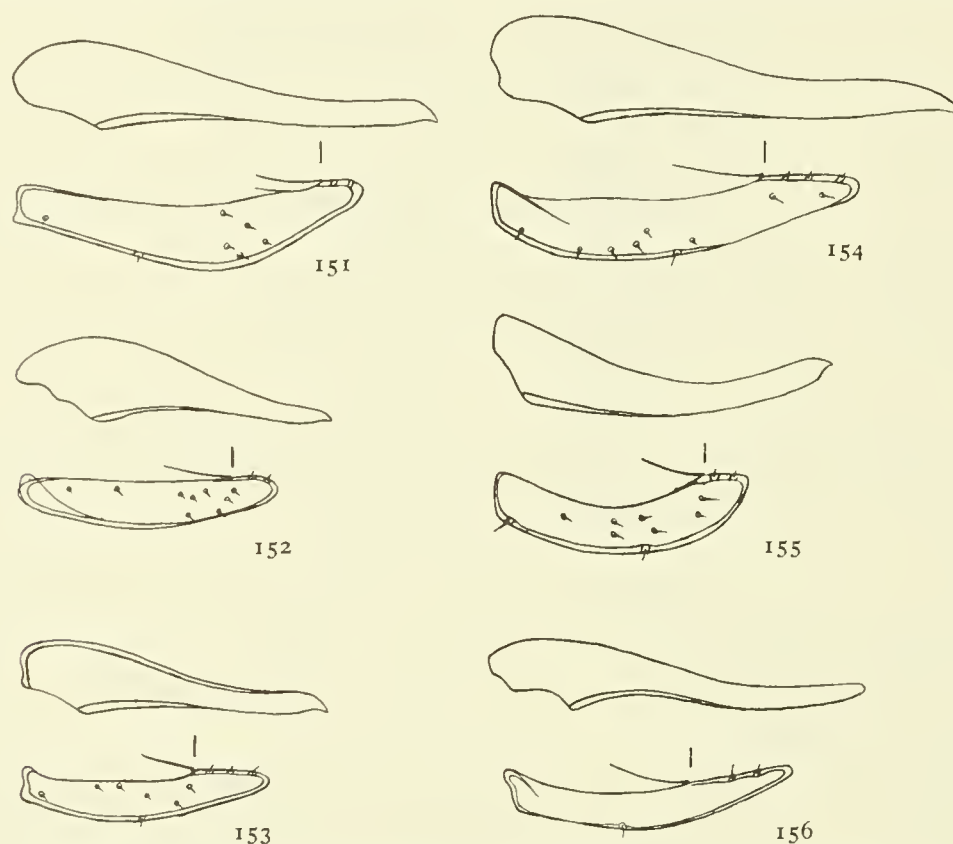
of spines in the middle of the hind margin which is present in other groups of the genus is absent. An irregular double row of short hairs on the surface. A group of several short, thick setae at the sides of the anal segment near the base of the segment and some longer setae at the posterior lateral corners.

**Genitalia.** Claspers 0.36 mm. long with a pronounced basal angle, slender, curved, tapering to a truncate end; a long seta dorsally, near the apex of the basal angle and a row of shorter setae near the inner side, reaching to the apical quarter. Basal arc rounded, with a short anterior process. Phallobase slender, conical, with some minute hairs near its basal articulation. Aedeagus with bulbous base, straight, tapering to a downwardly directed point. Apodeme slightly longer than the aedeagus, with a moderately broad end-plate. Parameres slightly shorter than the aedeagus, with curved ventral side and rounded tips, some minute hairs near the tip. The phallobase joins the paramere very close to its tip.

**Female abdomen.** Tergite 1 as in the male. Tergite 2 very short, with a marginal row of moderately long, thin setae, which are more widely spaced laterally and alternate there with short spines. Surface bare except for a group of 6-8 short hairs in the middle. Tergite 3 with



2 long vertical setae near the middle of the hind margin and 3 shorter horizontal setae laterally. These setae alternate with short spines. There is a group of 25–30 short setae, which are longer posteriorly, between tergites 2 and 3. Tergite 6 longer and broader than 3, with 4 long vertical setae alternating with groups of short, thick spines and 1–2 shorter horizontal setae laterally. Surface of tergites 3 and 4 bare. Anal segment broadly rectangular, with 2 lateral triangular sclerites which each bear a row of 5–6 short spines along their inner posterior margins. These rows form an angle with the apex anteriorly. A group of 4–5 long setae and some spines present at the posterior corners. Sternite 1+2 as in the male, with 38 spines in the ctenidium. Sternites 3 and 4 membranous, with uniform marginal rows of



Figs. 151–156. Aedeagus and paramere of species of the *parilis* group: 151. *N. parilis*; 152. *N. sarasini*; 153. *N. bakeri*; 154. *N. papuensis*; 155. *N. spinosa*; 156. *N. rothschildi*.

moderately long setae, 2–3 rows of short hairs on the surface of sternite 3 and only a single row of very short spines on sternite 4. Sternites 5 and 6 with triangular lateral sclerites which are larger on sternite 6. They have double marginal rows of long setae and short spines. Sternites 7–8 triangular, with 2 long setae near the apex and a double row of 4 long setae and 4 short spines further basally at each side, reaching close to the two apical setae. The apical part bearing the two setae probably represents sternite 8 and the row of setae is the marginal row of sternite 7. In related species both these parts are connected by a membrane and not fused as in *N. parilis*. There is no genital plate, sternite 8 functioning as such. Only a few spines on the ventral surface of the anal segment.

Distribution: Moluccas (type locality), New Guinea, Queensland.

## MATERIAL IN THE COLLECTION

## MOLUCCAS

Batchian, ♂ holotype, A. R. Wallace, ex coll. Saunders (Brit. Mus. 68.4).

Amboina, from *Miniopterus schreibersi*, 1908, F. Muir, 15 ♂ 15 ♀ (no. 435).

Amboina, from *Miniopterus schreibersi*, 1909, F. Muir, 2 ♂ 3 ♀ (Brit. Mus. 1911.289).

## AUSTRALIA

Cooktown, Queensland, from *Miniopterus schreibersi*, N. C. Rothschild, 2 ♂ (Brit. Mus. 1913.450).

Mossman, Queensland, from *Miniopterus schreibersi*, June 1910, F. Muir, 1 ♀ (no. 473).

## OTHER MATERIAL EXAMINED

## NEW GUINEA

Misima Island, from *Miniopterus* sp. no. 14243, 8.vii. 1956, 1 ♀. 5. Archbold Expedition.

**Nycteribia bakeri** Scott, 1932

(Figs. 153, 157-159)

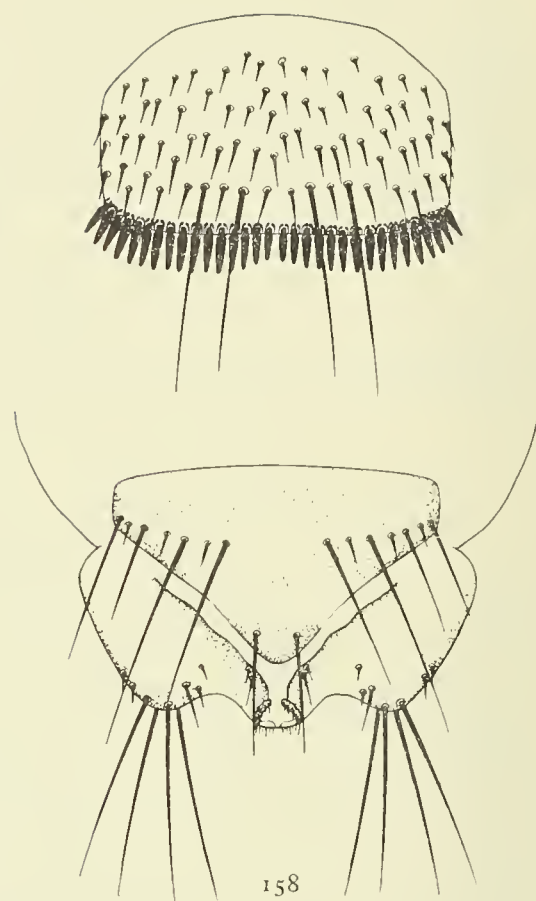
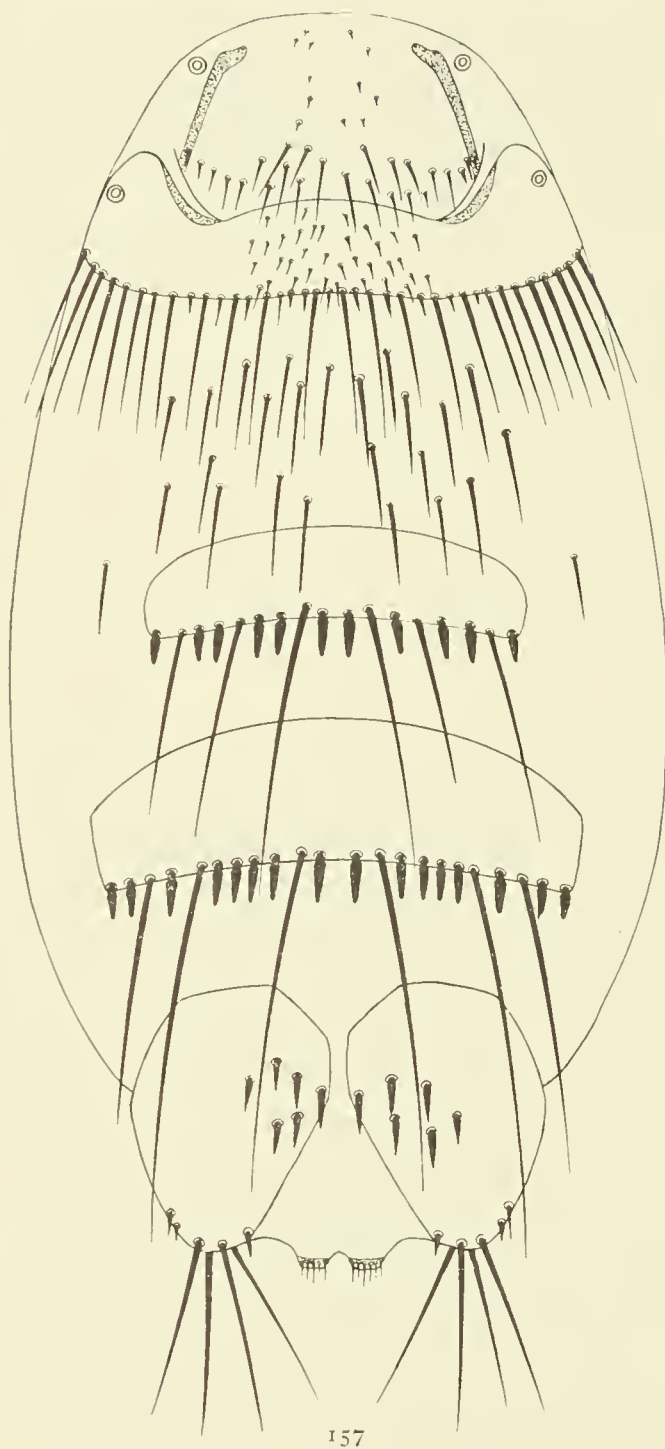
*Nycteribia bakeri* Scott, 1932, *Stylops*, 1, 16.

Length, head and thorax as in *N. parilis*.

**Male abdomen.** Dorsal surface as in *N. parilis*, but the short hairs on tergite 2 are more numerous. Anal segment shorter than in *N. parilis*, slightly conical, with a transverse row of short spines on the dorsal surface. Sternite 1+2 with about 5 rows of short hairs on the surface and 2-4 long setae in the posterior row. Surface of sternites 3-5 covered with short hairs. The hairs on sternite 5 placed in 2-3 rows and longer than in *N. parilis*. There are 2 longer and 2 short setae in the middle of the hind margin of sternite 5 and some premarginal short spines.

**Genitalia.** Claspers with a basal angle and short, thick, apical parts, tapering to a short, truncate tip; a long seta near the basal angle and short setae extending to near the tip at the inner side. Aedeagus short, straight, conical, with downwardly pointing sharp tip. Apodeme much longer than the aedeagus. Parameres slender, slightly curved, tapering to a rounded tip.

**Female abdomen.** Tergite 2 with a marginal row of moderately long, thin setae. These are placed close together laterally and are more widely spaced in the middle, where they alternate with groups of 1-2 short spines. A group of about 35 short hairs in the middle of the surface. The group on the connexivum between tergites 2 and 3 consists of about 25 moderately long setae. Tergite 3 short and wide, nearly as wide as tergite 6, with a marginal row of 2 long setae in the middle and 3 shorter setae laterally. A short seta on the connexivum lateral of tergite 3 in most specimens. Tergite 6 wide, with a marginal row of 6 long setae alternating with groups of 1-4 short spines. Anal segment wider than long, with two elliptical sclerites dorsally which each bear groups of 6-9 spines in 2-3 rows in the middle. Sternite 1+2 as in the male, with 2-4 long setae in the posterior row of the surface. Spines stronger than in *N. parilis* in general. Sternites 7-8 triangular, sternite 8 connected with sternite 7 by a membrane, with 2 long setae at the apex. A transverse row of 4 setae and 2 spines at each side of sternite 7 with a wide gap in the middle between the two rows and between the rows and the apical setae. A few short spines on the ventral side of the anal segment. There is an elliptical little sclerite without setae between anus and genital opening, which may represent a rudimentary genital plate.



Figs. 157-159. *Nycteribia bakeri* Scott. 157. female abdomen, dorsal; 158. female sternite 1+2 and posterior part of abdomen, ventral; 159. male sternite 5 and genital area.



## MATERIAL IN THE COLLECTION

## NEW HEBRIDES

Tana, from *Miniopterus australis*, 22.ix. 1925, P. A. Buxton, ♂ holotype, 1 ♂ 3 ♀ paratypes (Brit. Mus. 1936.99).  
 Espiritu Santo, Hog River, from *Miniopterus australis*, 21.vii. 1925, P. A. Buxton, 2 ♂; 15.ii. 1927, J. R. Baker,  
 4 ♂ 4 ♀ paratypes.

## OTHER MATERIAL EXAMINED

Chillagos, Queensland, from *Miniopterus schreibersi blepotis*, 7.i. 1922, C. M. Hay, 1 ♀, and numerous specimens  
 from Malo Islands, New Hebrides, from *Miniopterus australis* (Chicago Natural History Museum).

## HOST SYNONYMY

<i>Name on original label</i>	<i>Current name</i>
<i>Miniopterus blepotis</i> Temminck.	<i>M. schreibersi blepotis</i> Temminck.

**Nycteribia papuensis** n.sp.

(Figs. 154, 160–162)

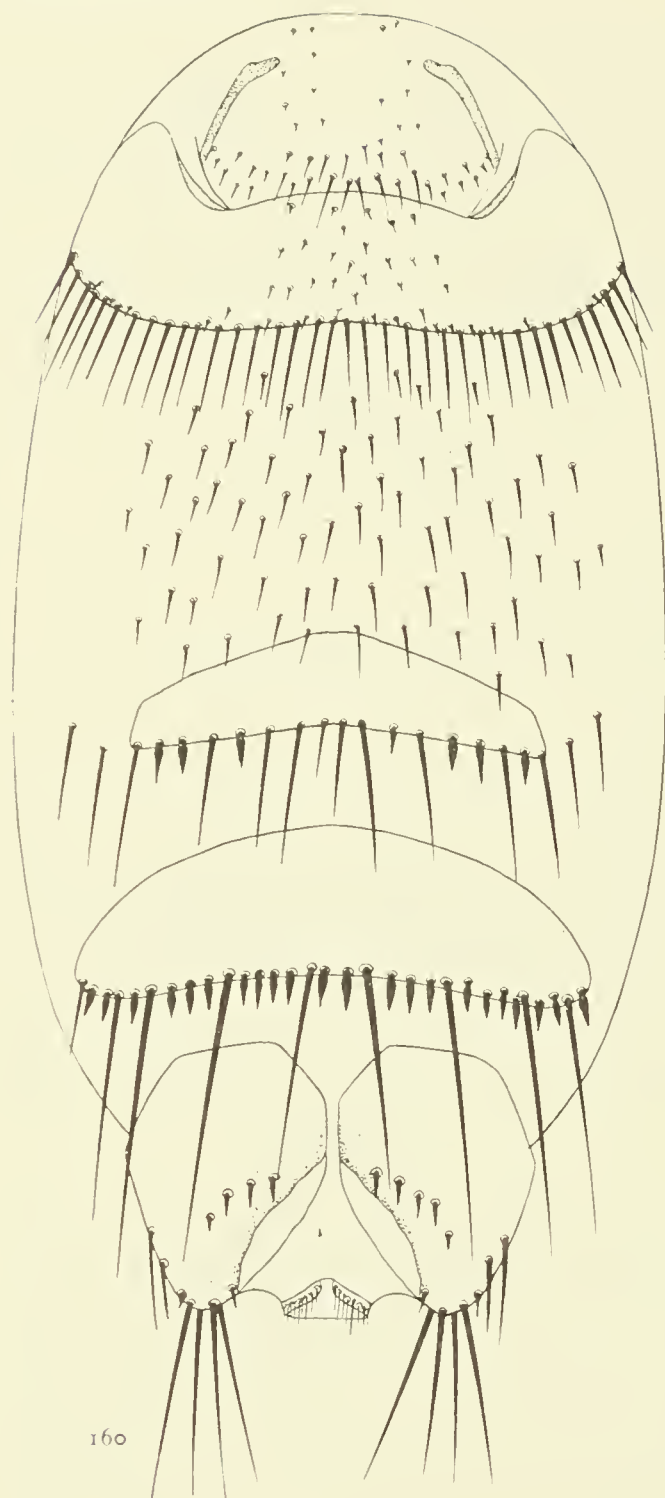
Length 1.5–2 mm. More strongly sclerotized and darker brown than *N. parilis*.

Head and thorax as in *N. parilis*.

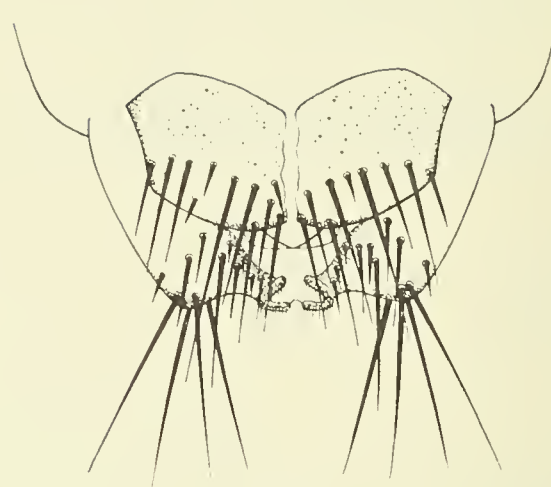
*Male abdomen.* Dorsal surface as in *N. parilis*, except for the following details. Tergite 1 with a single marginal row of short thin setae. Tergite 2 with a uniform marginal row of longer thin setae, only 1–2 short spines in the middle of the row. Anal segment wider than long, conical, much shorter than in *N. parilis*. A few scattered spines on the surface of tergites 5 and 6 which are bare in *N. parilis*. Sternite 1 + 2 with a ctenidium of 40 spines and short setae on the surface. Sternite 5 with a marginal row of long setae laterally and shorter setae in the middle.

*Genitalia.* Claspers thin, curved, with a basal angle, rather similar to those of *N. parilis*, but slightly shorter (0.32 mm. long) and tapering to a dark point. Aedeagus as in *N. parilis* in shape, but longer and with a more pointed end. Parameres less strongly curved than in *N. parilis*. Phallobase joins paramere at apical quarter.

*Female abdomen.* Post-spiracular sclerite with a short seta near the spiracle and 2 shorter ones near the other end. Tergite 1 with a single or double marginal row of short setae. Tergite 2 with uniform marginal row of moderately long setae which are longer and stand more closely together laterally. A few short spines between the setae in the middle. The group on the surface of tergite 2 consists of 25–30 short hairs. About 50 short setae on the connexivum between tergites 2 and 3. Tergite 3 very wide, nearly as wide as tergite 6. There are 10 short horizontal setae in the marginal row, the median setae not longer than the lateral ones. One or two setae laterally on tergite 3, continuing the marginal row. 5–7 short spines, in groups of two or single, between the setae at the sides of the marginal row of tergite 3. Tergite 6 wider than tergite 3, with a marginal row of 8 long, upright setae alternating with groups of 2–4 short spines. Surface of tergites 3 and 6 bare. Anal segment very short, wider than long, with 2 rows of 3–5 spines at the posterior borders of the sclerites as in *N. parilis*, but the angle formed by the two rows is shallower. Sternites 7–8 broadly rounded posteriorly, with a double row of about 15 setae and some spines along the posterior margin. Sternite 8 does not project beyond sternite 7, but is apparently indicated by the two median setae. Several short setae near the inner margin of the lateral sclerites on the ventral side.



160



161



162

Figs. 160-162. *Nycteribia papuensis* n.sp. 160. female abdomen, dorsal; 161. same, ventral, posterior part; 162. male sternite 5 and genital area.

This species is closely related to *N. parilis*, but differs in a number of characters, mainly in the chaetotaxy of the female abdomen and the structure of sternites 7-8.

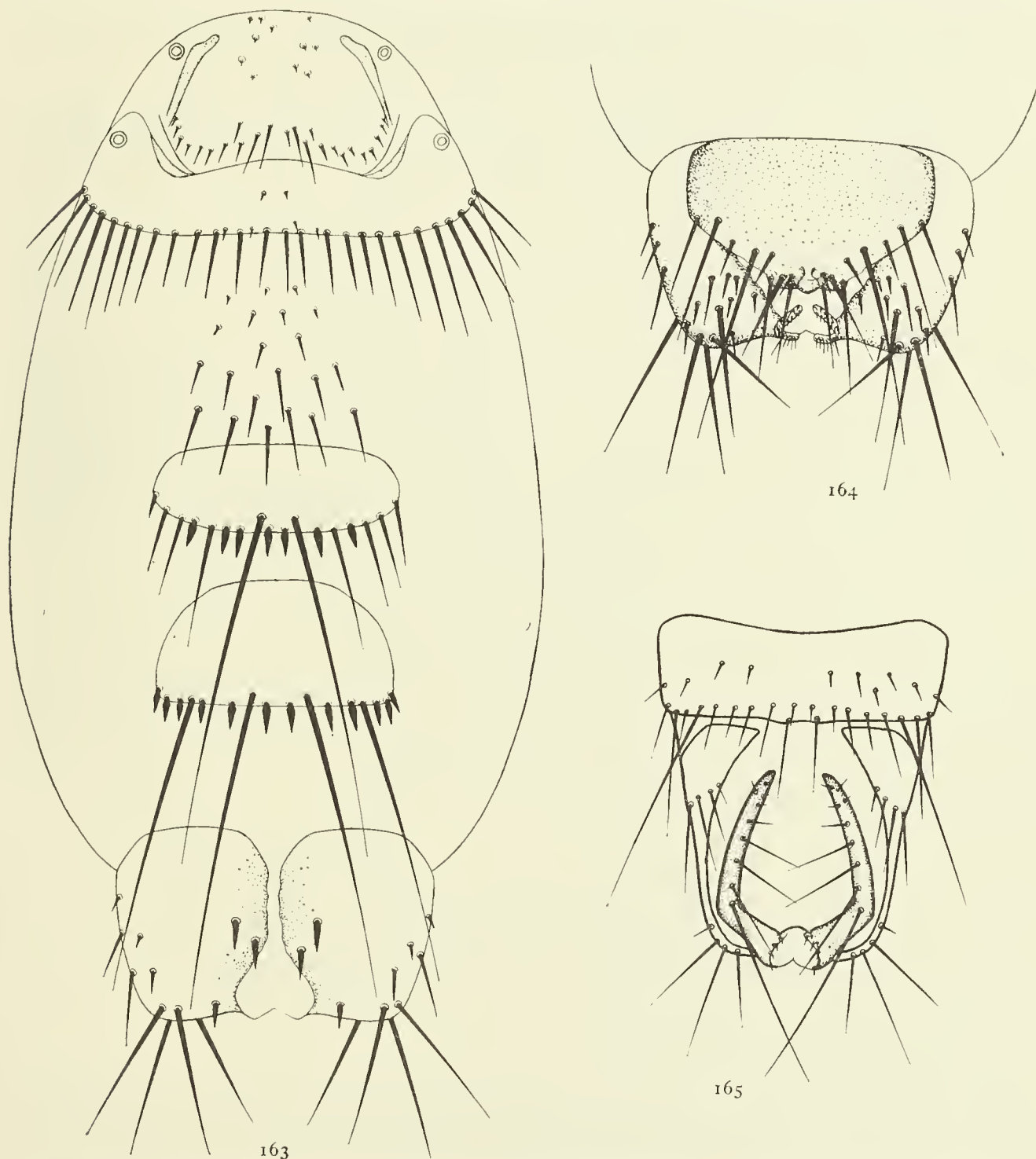
NEW GUINEA. Papua, Mt Dayman, Maneau Range, 30.vi. and 6.vii. 1953. H. M. van Deusen, ♀ holotype, 2 ♂ 3 ♀ paratypes. Chicago Natural History Museum.

**Nycteribia rothschildi** n.sp.

(Figs. 156, 163-165)

Length 1.75 mm. Head and thorax as in *N. parilis*.

**Male abdomen.** Tergite 1 with a single marginal row of short spines. Tergite 2 with a marginal row of longer setae alternating with short spines. Only 5-7 short hairs on the surface. Tergite 3 similar, but the two median marginal setae longer and 7-12 setae on the surface. Tergite 4 with



Figs. 163-165. *Nycteribia rothschildi* n.sp. 163. female abdomen, dorsal; 164. same, ventral, posterior part; 165. male sternite 5 and genital area.



2 very long setae in the middle of the marginal row and with shorter setae alternating with strong spines laterally. 7-10 short setae on the surface of tergite 4, tergites 5 and 6 bare. Anal segment as long as wide at the base dorsally and with a transverse row of spines in the middle. Sternite 1 + 2 with a ctenidium of 30 short spines and with 4-5 rows of short setae on the surface. Two setae of the posterior row are longer than the others and reach beyond the ctenidium. Sternites 3-5 as in *N. parilis*.

*Genitalia.* Claspers slender, resembling those of *N. parilis*, 0.25 mm. long. Aedeagus slender, tapering, slightly curved upwards apically. Parameres slender, phallobase joining the parameres at the apical third.

*Female abdomen.* Tergite 1 with a marginal row of short setae which is single laterally and double in the middle. Tergite 2 with a uniform marginal row of setae which are longer laterally. 2-3 minute spines in the middle of the row and 2-3 such spines on the surface of the tergite. The group on the connexivum between tergites 2 and 3 consists of about 20 setae which are longer posteriorly and of short spines anteriorly. Tergite 3 as in *N. parilis*, with 2 vertical setae in the middle of the marginal row and 3 shorter setae laterally. There are several short spines between the setae in the middle of the row. Tergite 6 not wider than tergite 3, with only 4 long vertical setae in the marginal row alternating with groups of 2 spines; spines only in the lateral corners. Anal segment short, rounded laterally, with 2 spines on each lateral sclerite in the middle and several more near the posterior lateral corners. Sternite 1 + 2 with 2 moderately long setae in the posterior row of the surface which reach beyond the ctenidium. Sternites 7-8 broadly rounded, with a single marginal row of short and long setae and several additional setae near the apex. 6-8 short setae on the ventral surface of the lateral sclerites of the anal segment.

This species is named in memory of the Hon. N. Charles Rothschild.

#### MATERIAL IN THE COLLECTION

##### SOLOMON ISLANDS

Hutuna, Tekanilakulaku cave, Rennell Island, from *Miniopterus australis*, 5.xi. 1953, J. D. Bradley, ♀ holotype, 4 ♂ 3 ♀ paratypes.

#### OTHER MATERIAL EXAMINED

##### SOLOMON ISLANDS

Munda, New Georgia, Oct. 1943, lot 43-18178, 1 ♀.

#### *Nycteribia sarasini* Falcoz, 1923

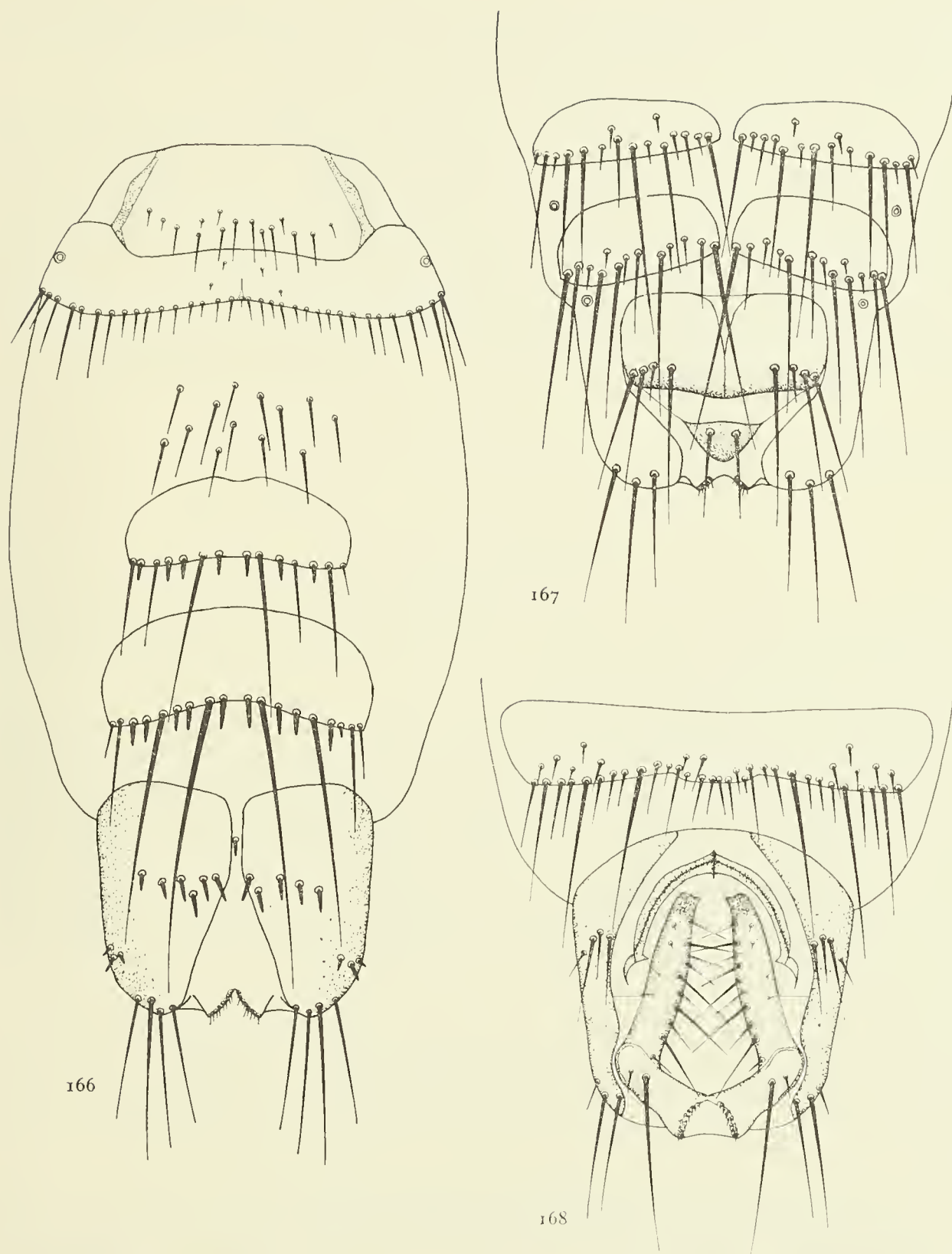
(Figs. 152, 166-168)

*Nycteribia sarasini.* Falcoz in F. Sarasin & J. Roux, 1923, *Nova Caledonia, Zoologie*, 3.

*Nycteribia sarasini* Falcoz. Scott, 1932, *Stylops*, 1, 16.

Length, head and thorax as in *N. parilis*.

*Male abdomen.* Tergite 1 with a single row of short setae near the hind margin. Anal segment slightly wider than long, shorter than in *N. parilis*. Sternite 5 with a marginal row of setae as in *N. parilis*, but there is a group of closely placed, short setae in the middle of the posterior margin on a shallow bulge.



Figs. 166-168. *Nycteribia sarasini* Falcoz. 166. female abdomen, dorsal; 167. same, ventral, posterior part; 168. male sternite 5 and genital area.

*Genitalia.* Claspers shorter and thicker than in *N. parilis*, with a truncate tip and a concavity at the inner side of the tip; a number of short hairs reaching to the tip. Aedeagus thick at the base, convex dorsally, with a short, truncate, nearly bifid end. Apodeme markedly longer than the aedeagus. Parameres short, parallel sided, with a rounded tip.

*Female abdomen.* Tergite 2 very short, with a marginal row of short setae laterally and long spines alternating with short spines in the middle half. Surface bare except for 2-4 minute spines in the middle. Only 10-12 short setae between tergites 2 and 3. Anal segment square, with two triangular lateral sclerites dorsally, each bearing a transverse row of 4-5 short spines in the middle. Sternites 7-8 triangular, with 2 setae at the apex and a transverse row of 3 setae and one spine at each side further basally. There is a wide gap between the lateral rows and the apical setae. The apical triangle with its two setae is connected with sternite 7 by a membrane.

Distribution: New Caledonia, New Hebrides.

#### MATERIAL IN THE COLLECTION

##### NEW CALEDONIA

Oubatche, from *Miniopterus australis*, 29.iii. 1912, L. Falcoz, 1 ♂ 1 ♀ paratypes.

#### *Nycteribia spinosa* n.sp.

(Figs. 155, 169-171)

*Nycteribia sarasini.* Falcoz in Sarasin & Roux, 1923, *Nova Caledonia, Zool.* 3 (*pro parte*, record from Mossman, Queensland).

Length, head and thorax as in *N. parilis*.

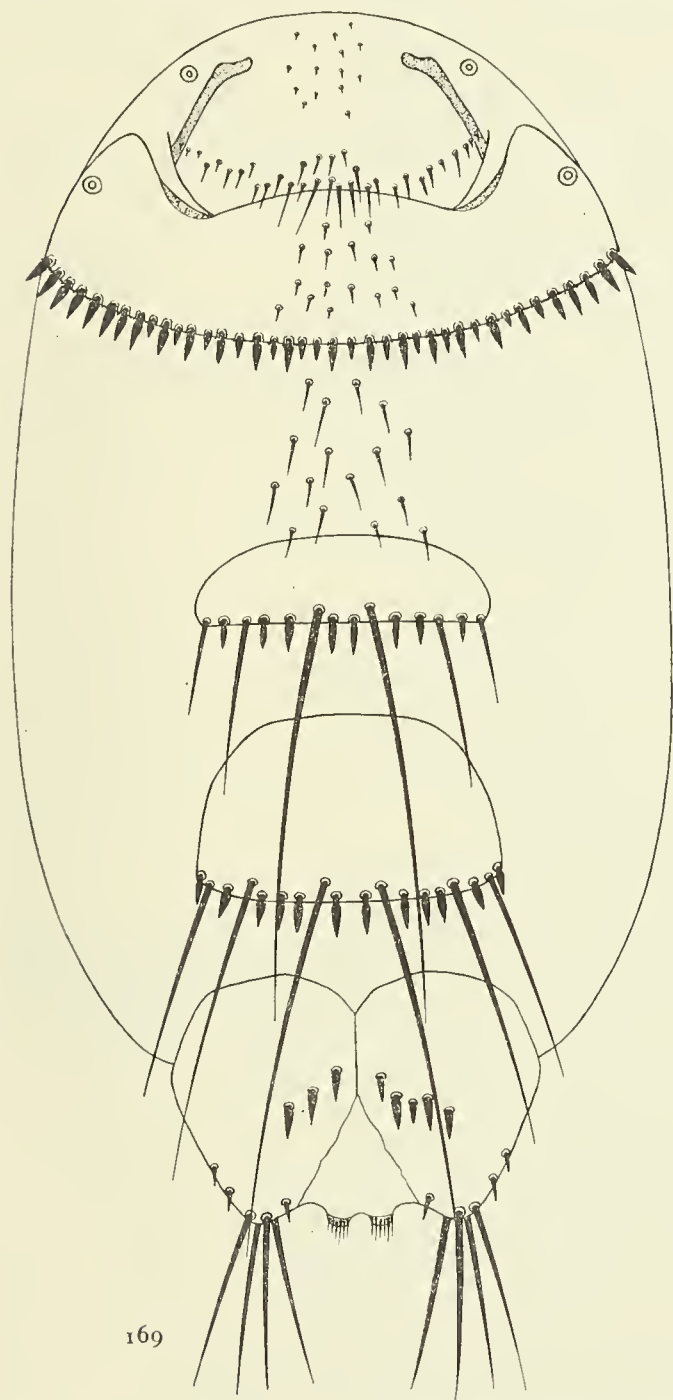
*Male abdomen.* Post-spiracular sclerite with 2 short setae near the spiracle and still shorter ones at the other end. Tergite 1 with a marginal row of short, thin setae and a premarginal row of very short hairs. Tergite 2 with a uniform marginal row of closely placed, moderately long setae. There are no short spines in the marginal row. Other tergites as in *N. parilis*, but there are several short setae on the surface of tergite 5 which is bare in *N. parilis*. Anal segment shorter than in *N. parilis*, wider than long. Sternite 1+2 with a ctenidium of 35 short, thick spines and only short hairs on the surface. Sternite 5 with a marginal row of long and short setae and a group of 4 thick spines in the middle of the hind margin. The two median spines are longer and thinner than the lateral ones in most specimens.

*Genitalia.* Claspers with a basal angle, with a short apical part, straight, thicker apically, ending in a curved, dark tip. A long seta dorsally near the apex of the basal angle and shorter setae extending to near the tip. Aedeagus conical, curved upwards, with a downwardly pointing tip. Apodeme longer than the aedeagus. Parameres short, curved, parallel sided, with rounded tip.

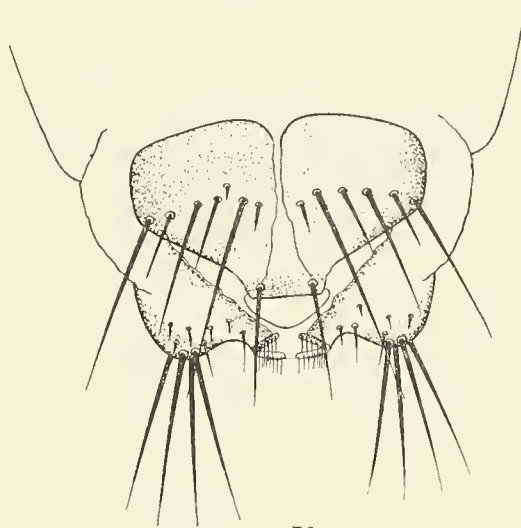
*Female abdomen.* Tergite 2 with a marginal row of short, thick spines, alternating in the middle with smaller spines. In the specimen from Cape York the spines are longer and the lateral spines much thinner than in the specimens from Mossman; there are no setae in the marginal row; a group of 15-20 short setae in the middle of the surface. An oblong group of about 20 short setae is present on the connexivum between tergites 2 and 3; this group is larger and wider in the specimen from Cape York. Tergite 3 with 2 long setae in the middle of the marginal



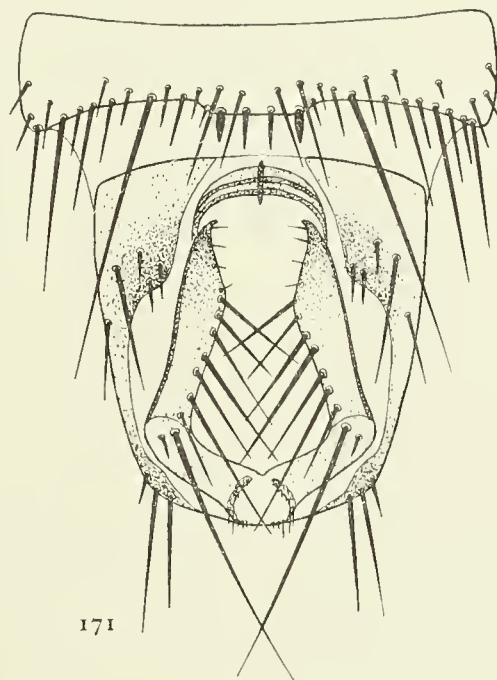
row and 2 shorter and thicker setae laterally; 7-8 short spines between the setae. Tergite 6 not wider than tergite 3, but about twice as long, with a marginal row of 6 long setae alternating with short spines in groups of 1-3. Anal segment slightly conical, short, wider than long. 4-5



169



170



171

Figs. 169-171. *Nycteribia spinosa* n.sp. 169. female abdomen, dorsal; 170. same, ventral, posterior part; 171. male sternite 5 and genital area.

spines in 1-2 rows on each sclerite on the dorsal surface. Sternites 7-8 triangular, with 2 setae near the apex and a transverse row of 3 long and 2-3 shorter setae at each side situated further basally. There is a curved or triangular sclerite beneath the apex of sternite 8, probably repre-

senting a rudimentary genital plate. There are 5–6 short setae on the ventral surface of the lateral sclerites of the anal segment.

*N. spinosa* is clearly differentiated from the other species of the group by the presence of a group of spines on sternite 5 of the male and by the marginal row of tergite 2 in the female.

## MATERIAL IN THE COLLECTION

## AUSTRALIA

Mossman, Queensland, from *Miniopterus schreibersi*, June 1910, F. Muir, no. 473, ♀ holotype, 1 ♀ 5 ♂ paratypes.  
Utingu, Cape York, Queensland, from *Miniopterus schreibersi*, 21.v. 1912, R. Kemp, 1 ♂ 1 ♀.

SUBGENUS **ACROCHOLIDIA** Kolenati, 1857

*Acrocholidia* Kolenati, 1857, *Wien. Ent. Monatsschr.* 1, 62.

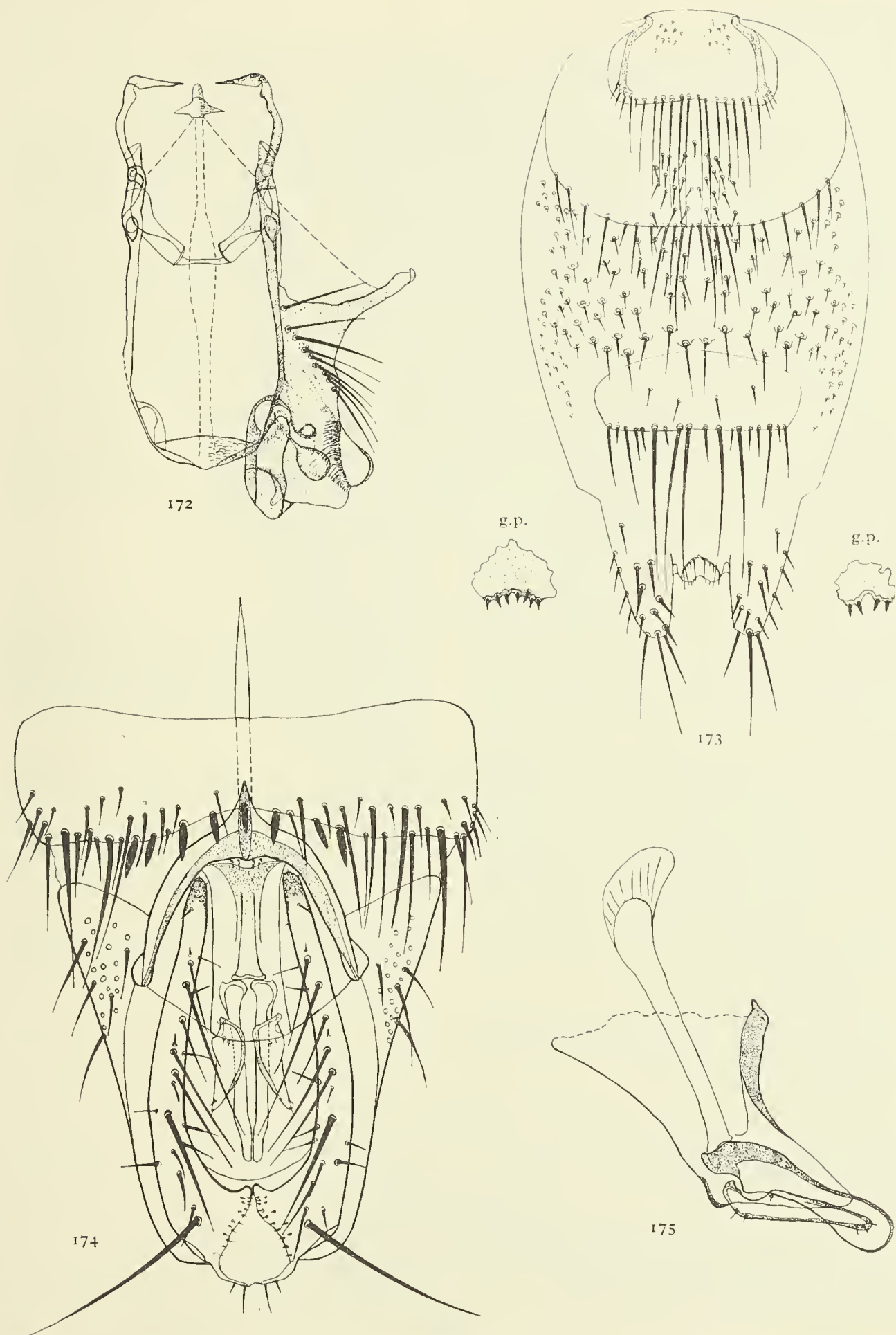
The subgenus contains only two species. The other species previously placed in this subgenus have proved to belong to the genus *Stylidia*. Diagnosis, see p. 51.

**Nycteribia (Acrocholidia) vexata** Westwood, 1835

(Figs. 51, 172–175)

- Nycteribia vexata*. Westwood, 1835, *Trans. Zool. Soc. London*, 1, 291.  
*Nycteribia montaguei*. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.  
*Nycteribia bechsteinii*. Kolenati, 1857, *Wien. Ent. Monatsschr.* 1, 62.  
*Acrocholidia montaguei* Kolenati. Kolenati, 1863, *Hor. Soc. Ent. Ross.* 2, 9.  
*Acrocholidia bechsteinii* Kolenati. Kolenati, 1863, *Hor. Soc. Ent. Ross.* 2, 9.  
*Nycteribia vexata* Westwood. Schiner, 1864, *Fauna Austr.* 2, 654.  
*Nycteribia ercolanii*. Rondani, 1879, *Bull. Soc. Ent. Ital.* 11, 7.  
*Nycteribia vexata* Westwood. Speiser, 1901, *Arch. Naturgesch.* 67, 11.  
*Nycteribia vexata* Westwood. Falcoz, 1923, *Arch. Zool. exp. gen.* 61, 521.  
*Nycteribia vexata* Westwood. Falcoz, 1924, *Bull. Mus. Hist. Nat.* 30, 223.  
*Nycteribia vexata* Westwood. Falcoz, 1926, *Faune de France*, 14, Paris.  
*Nycteribia vexata* Westwood. Scott, 1925, *Rec. Ind. Mus.* 27, 351 (*pro parte*, the record from the Himalayas refers to *N. lindbergi*).  
*Nycteribia vexata* Westwood. Gil Collado, 1932, *Eos*, 8, 29.  
*Nycteribia vexata* Westwood. Corradetti, 1934, *Riv. Malar.* 13, 338.  
*Nycteribia vexata* Westwood. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, 17, 9.  
*Nycteribia vexata* Westwood. Karaman, 1939, *Ann. Mus. Serb. merid.* 1, 31.  
*Nycteribia vexata* Westwood. Stefanelli, 1942, *Riv. Parassit.* 6, 25, 61.  
*Nycteribia vexata* Westwood. Saccà & Bettini, 1949, *Riv. Parassit.* 10, no. 1.  
*Nycteribia vexata* Westwood. Leclercq & Theodorides, 1950, *Ent. Monthl. Mag.* 86, 74.  
*Nycteribia vexata* Westwood. Aellen, 1952, *Bull. Soc. Sci. nat. Maroc.* 31, 149.  
*Nycteribia vexata* Westwood. Aellen, 1955, *Bull. Soc. Neuchatel Sci. nat.* 78, 81.  
*Nycteribia vexata* Westwood. Ricci, 1953, *Riv. Parassit.* 14, 219.  
*Nycteribia vexata* Westwood. Theodor & Moscona, 1954, *Parasitology*, 44, 157.  
*Nycteribia vexata* Westwood. Theodor, 1954, in Lindner, *Fliegen Palaearkt. Region*, 66a, 21.  
*Nycteribia vexata* Westwood. Grulich & Povolny, 1955, *Fol. Zool. Ent.* 4, 111.  
*Nycteribia vexata* Westwood. Balcells, 1956, *Speleon*, 6, 287.  
*Nycteribia vexata* Westwood. Hurka, 1958, *Fol. Zool.* 7, 231.

Length 2–2.5 mm. Head sclerotized up to the anterior margin which bears 4–6 setae. Labella of the proboscis longer than the theca. Thorax as in the subgenus *Nycteribia*, 8–10 notopleural setae which begin further posteriorly than in *N. pedicularia*. Tibiae slender, 3.5 times as long as wide, with 3 rows of setae in the distal half.



Figs. 172-175. *Nycteribia vexata* Westwood. 172. dorsal pattern of thorax; 173. female abdomen, dorsal, and genital plate (2 aspects); 174. male sternite 5 and genital area; 175. male genitalia.



*Male abdomen.* Tergite 1 with short hairs at the posterior margin. Tergites 2-6 with marginal rows of setae of uniform length which are longer on the posterior tergites, particularly 4 setae on tergite 6. Groups of short hairs on the surface of tergites 2-4. Sternite 5 slightly concave posteriorly, with a row of 7-8 spines at the posterior margin in most specimens, rarely 5 or 9-10.

*Genitalia.* Claspers thin, slightly curved, with blunt, dark tip, of nearly uniform thickness throughout. Phallobase conical. Aedeagus with broadly rounded end which is as wide as the basal part. Parameres narrowly triangular.

*Female abdomen.* Tergite 1 with a marginal row of long setae. Tergite 2 broadly rounded, slightly shorter in the middle than the width of the tergite 1, with a small group of short hairs on the surface. Tergite 6 with 5-6 long setae in the marginal row and several shorter setae. A few hairs on the surface. Connexivum between tergites 2 and 6 covered with hairs which are less numerous than in *N. pedicularia*. Anal segment with long anal processes with setae at the end and short spines dorsally. Sternite 1 + 2 with a ctenidium of 45-50 spines. Sternites 5 and 6 divided into lateral sclerites with long setae in the marginal rows. Sternite 7 undivided, rectangular. Dorsal genital plate of irregular triangular or rounded form with a more heavily sclerotized posterior margin with 4-6 short spines. Ventral genital plate absent.

Distribution: Continental Europe, North Africa, West Asia.

MATERIAL IN THE COLLECTION

No locality. In the original bottles, don. Kolenati, 6 ♂ 6 ♀ (Brit. Mus. 1856.163).

HUNGARY (Now Romania)

Herculesbad, July 1907, F. J. Cox, N. C. Rothschild, 3 ♂ 1 ♀.

ITALY

Isola Bella, Lago Maggiore, 16.viii. 1901, N. C. Rothschild, circ. 60 ♂ ♀.

Bergamo, from *Myotis myotis*, 1.vii. 1911, A. Ghidini, N. C. Rothschild, 2 ♂ 2 ♀.

Toscana, from *Vespertilio murinus*, 1915, N. Cimbali, N. C. Rothschild, 5 ♂ 5 ♀.

Florence, from *Vespertilio murinus*, 1918, N. Cimbali, N. C. Rothschild, 1 ♀.

SARDINIA

Oristano, from *Myotis myotis*, A. H. Krausse, N. C. Rothschild, 4 ♀.

ALGERIA

Djebel Taya, from *Myotis blythi oxygnathus*, 14.ii. 1911, E. Hartert, C. Hilgert, pres. W. Rothschild, N. C. Rothschild, 3 ♀.

Subterranean lake, Hammam Meskoutine, from *Myotis blythi oxygnathus*, 1.iv. 1913, P. A. Buxton, 1 ♂ 1 ♀.

Hammam Meskoutine, from *Rhinolophus hipposideros*, May 1914, K. Jordan, W. Rothschild, pres. N. C. Rothschild, 5 ♂ 5 ♀.

TUNISIA

Tunis, from *Myotis blythi oxygnathus*, 1919, M. Weiss, 2 ♀.

Djebel Gloub, Khroumirie, from *Myotis myotis*, H. G. Kerville, N. C. Rothschild, 2 ♂ 3 ♀.

Djebel Gloub, Khroumirie, from *Rhinolophus euryale*, H. G. Kerville, N. C. Rothschild, 3 ♀.

ISRAEL

Krat Ghanami near Ajeleth Hashahar, Galilee, from *Myotis myotis*, 9.viii. 1946, O. Theodor, 1 ♀ (Brit. Mus. 1947.146).

IRAN

Elburz Mountains, from *Myotis myotis*, R. B. Woosnam, 1 ♂.

OTHER MATERIAL EXAMINED

France, from *Myotis myotis*. Germany, from *Plecotus auritus* and *Rhinolophus hipposideros*. Morocco, Oued Mellah. Turkey, from *Vesperugo* sp.

HOST SYNONYMY

Name on original label  
*Myotis oxygnathus* Monticelli.  
*Vespertilio murinus* L.  
(African and probably some Italian records.)

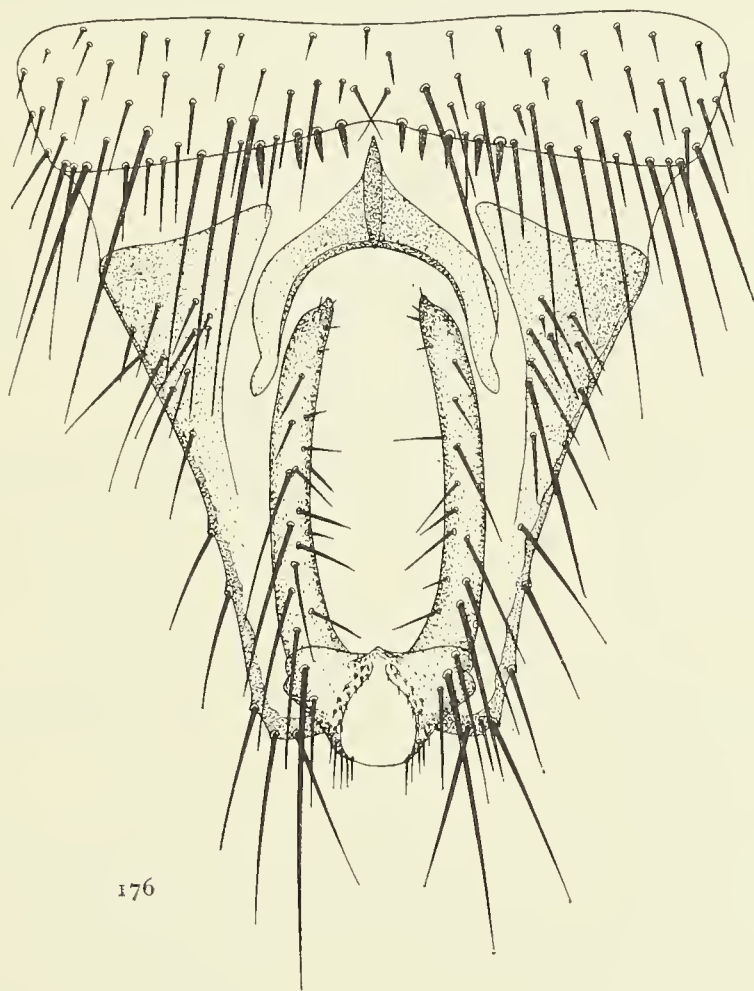
Current name  
*Myotis blythi oxygnathus* Monticelli.  
*Myotis myotis* Borkhausen or *M. blythi oxygnathus* Monticelli.

**Nycteribia (Acrocholidia) lindbergi** Aellen, 1959

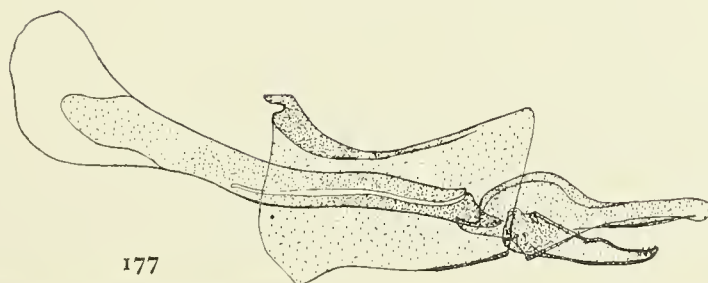
(Figs. 176, 177)

*Nycteribia vexata lindbergi*. Aellen, 1959, *Rev. Suisse Zool.* **66**, 555.*Nycteribia vexata* Westwood. Scott, 1925, *Rec. Ind. Mus.* **27**, 351. (Record from the Himalayas.)Length, head and thorax as in *N. vexata*. Colour light brown.

*Male abdomen.* All tergites with rows of long and short setae at the posterior margins and the surface of tergites 2–6 covered with short hairs. Only 1–2 rows on tergite 6. Sternite 5 with a group of 10–12 spines in the middle of the posterior margin, but the spines are shorter than in *N. vexata*.



176



177

Figs. 176, 177. *Nycteribia (Acrocholidia) lindbergi* Aellen. Male. 176. sternite 5 and genital area; 177. genitalia.

*Genitalia.* Basal arc triangular, claspers long, slender and slightly curved. Phallobase nearly cylindrical. Aedeagus with very wide basal part and slender apical part, ending in a rounded tip. Apodeme long, with a wide end-plate. Parameres triangular, with a sharp distal point and 2 short hairs near the tip.

*Female abdomen.* Tergite 1 with a single marginal row of short setae. Tergite 2 short, with a marginal row of short, thick setae alternating with short spines; there is a group of about 40 short hairs on the surface. Tergite 6 elliptical, with 6–8 long setae and some short setae and short spines at the hind margin and a few short hairs on the surface. Anal segment with long processes which are covered with short setae and have 3–4 long setae at the end. Sternite 1 + 2 with a ctenidium of 40 spines. Sternite 5 with elliptical lateral sclerites, sternite 6 undivided. Genital plate with 4–5 short setae which are longer than in *N. vexata*.

Distribution: Afghanistan, India.

Type series in the Muséum d'Histoire Naturelle, Geneva.

#### MATERIAL IN THE COLLECTION

##### INDIA

Keonthal State, Himachal Pradesh, N.W. Himalayas, from bat, 11.vii. 1912, P. J. Dodsworth, N. C. Rothschild, 1 ♂.

#### OTHER MATERIAL EXAMINED

##### INDIA

Pashok near Darjeeling, June 1916, L. C. Hartless, 1 ♂ 1 ♀.

##### AFGHANISTAN

Kham Zindan Cave, Belchiragh, from *Myotis blythi oxygnathus*, 29.x. 1957, K. Lindberg, 1 ♀ para-type.

#### GENUS *STYLIDIA* Westwood, 1840

*Stylidia* Westwood, 1840, *Introd. modern class. insects*, 2. Type species: *Stylidia biarticulata* Hermann, 1904.

*Phthiridium* Hermann, 1804, *Mém. Aptér.* p. 120. (Synonym of *Nycteribia*.)

*Celeripes* Montagu, 1808, *Trans. Linn. Soc. Lond.* 9, 166 (nomen nudum).

Head sclerotized nearly up to the anterior dorsal margin, leaving only a small triangle in the middle membrane. The head is only slightly compressed laterally in some species. Eyes absent. Lateral plates of the notopleural sutures present only in the posterior half. Notopleural setae more widely spaced anteriorly. Haltere groove without cover. The row of setae at the posterior margin of the sternal plate of the thorax is reduced, with a wide gap in the middle. Thoracic ctenidium with pointed spines. Tibiae long, scalpel-shaped, 4–5 times as long as wide, with 3 rows of setae in the distal part of the ventral edge. Post-spiracular sclerite narrow with several setae. Abdominal ctenidium well developed in both sexes. Abdomen of the female with 3 tergites before the anal segment, the second and third of which may be divided or not. Dorsal genital plate either shield-shaped or forming a lip which covers the genital opening from above. Anal segment either with long styles or not. Sternite 5 of the male with an armature of spines at the posterior margin which may be divided into two lobes, each bearing spines. This armature is absent only in one species. Aedeagus curved or straight, tapering. Parameres either partly or completely fused with the phallobase.



About 30 species distributed throughout the Old World, from Europe to Australia.

The genus can be divided into two groups as follows:

1. *biarticulata* group. 3–8 setae, of which one is longer than the others, at each side of the posterior margin of the sternal plate of the thorax. The row of notopleural setae extends anteriorly to about halfway between the base of the mesopleural suture and the anterior spiracle. The anterior notopleural setae are more widely spaced than the posterior ones. Femur 3 shorter than the thorax and sternite 1 + 2 together (including the ctenidium). Sternite 5 of the male incompletely divided by a median indentation of the posterior margin, with 2 groups of spines, or undivided with a single group of spines. Dorsal genital plate of the female large, with a few minute hairs posteriorly, or without hairs and covering the genital opening from above. The majority of the species of the genus belongs to this group.

2. *scissa* group. Only a single short seta at the sides of the posterior margin of the sternal plate of the thorax. The row of notopleural setae does not extend anteriorly beyond the base of the mesopleural suture. Legs very long. Femur 3 as long as thorax and sternite 1 + 2 together. Sternite 5 of the male incompletely divided by a deep median indentation with 2 groups of spines near the indentation. Dorsal genital plate of the female very small. Ventral plate with concave surface and scale-like ridges. Only 2 species and 2 subspecies in the Ethiopian region.

# KEY TO THE SPECIES OF *STYLIDIA*

## MALES

1. Posterior margin of the sternal plate of the thorax with 3–8 setae at each side. Notopleural setae reaching halfway between the base of the mesopleural suture and the anterior spiracle. (biarticulata group) 2  
Only a single short seta at each side of the posterior margin of the sternal plate. Notopleural setae not reaching anteriorly beyond the base of the mesopleural suture. (scissa group) 26
2. Sternite 5 with an armature of spines in the middle of the posterior margin. 3  
No armature of spines at the posterior margin of sternite 5, but only longer and shorter setae. Small insect, length 1.5–1.75 mm. Claspers straight, short, with a blunt end. Burma (Figs. 196, 197). *S. caudata* (p. 131)
3. Tergites 2–6 divided into lateral sclerites. Sternite 5 deeply divided by an indentation in the middle which widens posteriorly. 35–40 spines at each side of the indentation. Claspers thick, curved, with dark tip. Near East (Figs. 186–189). *S. biloba* (p. 127)  
At least tergites 4–6 or 5–6 undivided. 4
4. Posterior margin of sternite 5 divided by a more or less clearly marked indentation with a group of spines at each side. (See note.) 5  
Posterior margin of sternite 5 undivided, with a single group of spines in the middle. 11
5. Larger insects, 3–3.5 mm. 6  
Smaller insects, 2–2.5 mm. 7
6. Anal segment long and narrow. Indentation of sternite 5 incomplete, narrowing posteriorly. Aedeagus straight, parameres with rounded tip, partly separate from the phallobase. Indochina (Figs. 283, 284). *S. tonkinensis* (p. 179)  
Anal segment short, broad, rounded apically. Indentation of sternite 5 wide, diverging posteriorly. Aedeagus strongly curved, parameres with a long apical process with upturned tip, completely fused with the phallobase. N.W. Himalayas (Figs. 247, 248). *S. nuditerga* (p. 160)

7. Median indentation of sternite 5 angular, shallow. The group of spines consists of 25 spines forming a triangle with the apex anteriorly. Aedeagus strongly curved, forming nearly a half circle. Parameres with a rounded base and a long triangular end with some short hairs. New Guinea (Figs. 207, 208). **S. curvata** (p. 137)  
Aedeagus straight or only slightly curved, parameres different. 8
8. Groups on sternite 5 consisting of long and short spines. 9  
Groups on sternite 5 consisting of short spines only. 10
9. Median indentation of sternite 5 narrow, about 25-30 spines in 3-4 rows at each side of the indentation. Africa (Figs. 280, 281). **S. tecta** (p. 177)  
Median indentation well marked, widening anteriorly. 3-5 long spines and 8-10 short spines at each side of the indentation. Malaya (Figs. 292, 293). **S. traubi** (p. 182)
10. Median indentation rounded anteriorly, widening posteriorly. 25-30 spines at each side of the indentation. Malaya (Figs. 218, 219). **S. fraterna** (p. 145)  
Median indentation narrow, 40-50 spines at each side. Africa (Figs. 229-231). **S. inopinata** (p. 151)
11. Phallobase with a curved, toothed process on the dorsal side. 12  
Phallobase lacking such a process. 13
12. Sternite 5 with only slightly curved posterior margin and a group of spines in 3 rows, the posterior spines about twice as long as the anterior ones. Parameres with a pronounced hump at the ventral edge. China (Figs. 271, 272). **S. szechuana** (p. 173)  
Sternite 5 with a median process of the posterior margin which bears a group of spines in 4-5 rows, the posterior spines about 5 times as long as the anterior ones. China (Figs. 249-252). **S. ornata** (p. 162)
13. Very large insects, 3.75-4 mm. 14  
Smaller insects, less than 3 mm. 15
14. The group of spines on sternite 5 consists of about 60 spines in 4-5 rows. Claspers slender, their outer side darkly pigmented. Anterior dorsal margin of the anal segment with a shallow concavity. Thailand (Figs. 241-243). **S. maxima** (p. 155)  
Group of spines on sternite 5 arranged in 6-7 rows, the anterior spines very short. Claspers thin, darkly pigmented, curved. Anterior dorsal margin of the anal segment with a deep, pointed incision which reaches to the posterior third of the segment. N.W. Himalayas, Burma (Figs. 226-228). **S. incisa** (p. 151)
15. Two bare, movable processes on sclerotized arms at the base of the anal segment. The group of spines on sternite 5 consists of about 40 spines in 4-5 rows. The posterior spines very long, the anterior spines very short. Claspers thick, straight, blunt, darkly pigmented. West Palaearctic (Figs. 182, 183). **S. biarticulata** (p. 122)  
No such processes or only immovable bulges. 16
16. Group of spines on sternite 5 on a median process, restricted to the median quarter of the posterior margin. 17  
Group of spines wider, at least on the median third or more. No marked median process. 18
17. 10-18 spines on the median process. Phallobase with a dorsal hump. Parameres with a lateral plate-like expansion. Ceylon, India (Figs. 259, 260). **S. phillipsi** (p. 165)  
45-60 spines on the median process, parameres simple. Africa (Figs. 255, 256). **S. ovalis** (p. 163)
18. Aedeagus straight. 19  
Aedeagus more or less curved. 21

NYCTERIBIINAE

STYLIDIA

19. About 45 very short spines on sternite 5 in 4-6 rows. Aedeagus very slender, nearly parallel sided in its greater part, with a rounded tip. Parameres with long, pointed apical process without hairs. Philippines (Figs. 190, 191). **S. brachyacantha** (p. 129)  
Group of spines different, consisting partly of longer spines. 20
20. About 40 spines in 2-3 rows, those of the posterior row markedly longer. Aedeagus tapering to a sharp, sclerotized tip. Parameres with rounded tip which bears a brush of hairs. They are partly separate from the phallobase. Philippines (Figs. 244, 245). **S. mindanaensis** (p. 158)  
About 60 spines in 4-5 rows. Aedeagus with membranous tip. China (Figs. 202-204). **S. chinensis** (p. 136)
21. The group of spines on sternite 5 consists only of very short spines, about 40 in 2-3 rows. Parameres with triangular, sharp apex. New Guinea, Queensland (Figs. 287, 288). **S. torresi** (p. 180)  
The group of spines on sternite 5 consists partly of longer spines. Parameres different. 22
22. Small species, 2 mm. About 25 spines in 2-4 rows on sternite 5. 4-6 spines in the middle of the posterior row markedly longer than the others. Parameres broadly rounded at the base, the apical 2/3 very slender, with a blunt tip and a few minute hairs. Java (Figs. 266, 267). **S. psiloteria** (p. 169)  
Larger species, 2.5-3 mm. Parameres different. 23
23. Parameres with marked ventral bulge. Claspers darkly pigmented. 24  
Parameres with nearly straight ventral edge. Claspers only dark at the tip. 25
24. Group of spines on sternite 5 consisting of about 15-25 spines. Parameres with 9-10 short setae reaching from the ventral bulge almost to the rounded tip. Claspers slender, slightly curved. Burma, Thailand (Figs. 210, 211). **S. euxesta** (p. 140)  
About 35 spines in 3 rows on sternite 5. Claspers very thick, nearly black. Parameres with long apical process with a hooked tip. 8-10 long setae at the ventral bulge, but not on the apical process. Japan, China (Figs. 222, 223). **S. hindlei** (p. 146)
25. About 28-35 spines on sternite 5 in 3 rows. Parameres with 3-4 short hairs at the ventral edge near the tip. Ceylon (Figs. 200, 201). **S. ceylonica** (p. 136)  
Only about 25 spines in 1-2 rows. Parameres with 3-5 long setae in the middle of the ventral edge. Middle East (Figs. 232-235). **S. integra** (p. 153)
26. Median indentation of sternite 5 narrow. The row of spines at the posterior margin consists of very long, long and shorter spines (Figs. 296-308). **S. scissa** (Speiser) and subspecies (p. 185)  
Median indentation of sternite 5 wide. The marginal row of the sternite consists of short setae. The spines of the anterior rows all very short, but longer than in *S. scissa* (Figs. 310, 311). **S. hoogstraali** (p. 191)

FEMALES

1. Posterior margin of the sternal plate of the thorax with 3-8 setae at each side. Notopleural setae reaching to halfway between the base of the mesopleural suture and the anterior spiracle. (biarticulata group) 2  
Only a single short seta at each side of the posterior margin of the sternal plate. Notopleural setae not reaching beyond the base of the mesopleural suture anteriorly. (scissa group) 23
2. Anal segment with two long styles with long setae at their tip. 3  
Anal segment short, lacking styles. 5
3. Marginal row of tergite 2 consisting of short setae only. Tergite 2 short, about as long as the width of tergite 1. Tergite 6 large, elliptical or rectangular, with 4 long setae posteriorly and several short setae on the surface. Genital plate large, 0.25 × 0.2 mm., shield-shaped, projecting from the surface in its posterior half. Borneo (Figs. 273, 274). **S. styligera** (p. 175)  
Marginal row of tergite 2 partly consisting of long setae. 4
4. Small species, 2 mm. 4 long setae in the middle of the marginal row of tergite 2. Tergite 6 small, rounded, bare on the surface. Bengal. **S. annandalei** (p. 122)



- Larger species, 2.5–3 mm. Tergite 2 very long, covering about half the abdomen, with long setae laterally in the marginal row and only short spines in the middle. Tergite 6 very large, triangular, with some short setae on the surface. West Palaearctic (Figs. 178, 179, 181).  
**S. biarticulata** (p. 122)
5. Genital plate projecting from the surface in its greater part, forming a lip which covers the genital opening from above. 6  
Genital plate shield-shaped or rectangular, lying on the surface in its greater part. 11
6. Tergite 2 very large, longer in the middle than the width of tergite 1. Marginal row of tergite 2 with 8–10 widely spaced, long setae. Only 6–8 short setae in 1–2 rows on the connexivum between tergite 2 and 6. Tergite 6 large, rectangular. Anal segment very narrow, parallel sided, lying close to tergite 6. Genital plate small, double; dorsal part projecting, elliptical, with a few minute hairs laterally. Ventral part rounded. Burma (Figs. 194, 195). **S. caudata** (p. 131)  
Tergite 2 shorter in the middle than the width of tergite 1, numerous hairs on the connexivum between tergites 2 and 6. 7
7. Anal segment conical, projecting from the abdomen, with well-marked posterior processes, each of which carries 2 long setae. Tergite 6 large, triangular. Genital plate very small, rounded, shorter than wide. Java (Figs. 264, 265). **S. psilotera** (p. 169)  
Anal segment very short, not projecting from the abdomen. 8
8. Tergite 2 completely divided into 2 rounded lateral sclerites with a strip of connexivum between them. 9  
Tergite 2 incompletely divided into halves by a median fold. 10
9. Dorsum of abdomen and pleurae covered with short, thick setae of uniform length. Genital plate oblong, posterior half free. Distal end of the tibiae short, strongly curved. Malaya (Figs. 289, 291). **S. traubi** (p. 182)  
Short setae only in the middle of the dorsum. Lateral parts of the dorsum and pleurae covered with short spines, particularly in the posterior part of the abdomen. Genital plate triangular, free in its greater part. Tibiae with longer, more pointed ends. Malaya (Figs. 217, 290). **S. fraterna** (p. 145)
10. Marginal setae of tergite 2 nearly as long as the tergite. Tergite 6 with 4 long setae and several shorter setae posteriorly. Dorsal genital plate large, semicircular, free. Ventral plate small, triangular. Sternites 6 and 7 separate. Africa (Figs. 275–279). **S. tecta** (p. 177)  
Marginal setae of tergite 2 very short. Tergite 6 with only 2 long setae and some short spines posteriorly. Dorsal genital plate very short and wide, ventral plate large, concave, with transverse ridges. Sternites 6 and 7 fused into an oblong plate. Africa (Figs. 253, 254). **S. ovalis** (p. 163)
11. Connexivum between tergites 2 and 6 bare. 12  
Connexivum between tergites 2 and 6 covered with hairs. 15
12. Tergite 2 large, with only moderately long setae in the marginal row. Tergite 6 divided into 2 rounded lateral sclerites. Genital plate shield-shaped, very large, 0.35 × 0.27 mm. Near East (Figs. 180, 184, 185). **S. biloba** (p. 127)  
Tergite 6 undivided. 13
13. Marginal row of tergite 2 with short setae laterally and short spines in the middle. Tergite 6 large, triangular. Genital plate large, shield-shaped, 0.32 × 0.2 mm. N.W. Himalayas (Fig. 246). **S. nuditerga** (p. 160)  
Marginal row of tergite 2 containing long setae. 14
14. Length 2 mm. Tergite 2 long, with a marginal row of about 15 long setae. Tergite 6 large, triangular, with 4 long setae posteriorly and some short hairs on the surface. Anal segment with a few very short spines on the dorsal surface, and 2 long setae at each posterior process. Szechuan (Fig. 270). **S. szechuana** (p. 173)

- Length 2.5 mm. Tergite 2 shorter, broadly rounded. Marginal row with long setae laterally and shorter setae in the middle. Tergite 6 rectangular, with bare surface. Anal segment with 5-6 short setae on the dorsal surface in each half. Middle East (Figs. 236-238). **S. integra** (p. 153)
- Length 2.5-3 mm. Tergite 2 large, rounded. Marginal row with long setae in the middle. Tergite 6 triangular, with 10-12 short setae on the surface and 6-8 moderately long setae posteriorly. Dorsal surface of the anal segment thickly covered with short setae. China, Japan (Figs. 220, 221). **S. hindlei** (p. 146)
15. Tergite 6 divided into 2 small sclerites or reduced to isolated setae. 16  
Tergite 6 undivided. 19
16. Very large insects, 4 mm. in length. Tergite 2 with a dense uniform marginal row of moderately long setae. Setae on the connexivum between tergites 2 and 6 longest in the middle posteriorly, shorter laterally. Anal segment short, wide, cylindrical. 17  
Smaller insects, length 3 mm., tergite 6 reduced to 2 isolated setae. 18
17. Tergite 6 consisting of two small triangular sclerites with 3-4 short setae. Genital plate oblong with 2-3 rows of short hairs at the base, some of them outside the plate. Thailand (Figs. 239, 240). **S. maxima** (p. 155)  
Tergite 6 consisting of 2 square sclerites adjoining in the midline, without setae. Genital plate triangular, with rounded distal end, with only one row of about 5 minute hairs at the base. India, Burma (Figs. 224, 225). **S. incisa** (p. 151)
18. Tergite 1 with a double row of short setae posteriorly. Connexivum between tergite 2 and 6 with a triangular group of long setae posteriorly. Only short spines lateral to this group. Lateral sclerites of sternite 6 longer than those of sternite 5. Lateral sclerites of sternite 7 oblong, longer than sternites 5 and 6 together. Genital plate wider than long, rounded posteriorly. Ceylon (Figs. 198, 199). **S. ceylonica** (p. 136)  
Tergite 1 with a single row of short setae posteriorly. Connexivum between tergites 2 and 6 covered with short, thick setae of uniform length, which extend on to the pleurae. A few longer setae posteriorly in the middle. Sternites 5 and 6 of equal length. Lateral sclerites of sternite 7 square, as long as sternites 5 and 6 together. Genital plate oblong or truncate triangular. Burma, Malaya (Figs. 209, 212). **S. euxesta** (p. 140)
19. Marginal row of tergite 2 with long setae. 20  
Marginal row of tergite 2 with only short setae. 21
20. Long setae only at the sides of the marginal row, fewer and shorter setae in the middle. 3-4 rows of short setae on the connexivum between tergites 2 and 6. Genital plate square. Africa (Figs. 268, 269). **S. rotundata** (p. 172)  
Long setae in the middle of the marginal row of tergite 2. Tergite 6 wide and short. Only 1-2 rows of short setae on the connexivum between tergites 2 and 6. Genital plate small, triangular. Ceylon, India (Figs. 257, 258). **S. phillipsi** (p. 165)
21. Tergite 6 truncate triangular, projecting posteriorly from the abdomen. Anal segment displaced ventrally, practically covered by tergite 6 in dorsal view, with 4 long setae posteriorly and a few short setae on the surface. Amboina (Figs. 261-263). **S. phthisica** (p. 168)  
Tergite 6 different, not projecting from the abdomen posteriorly. 22
22. Tergite 2 shorter than the width of tergite 1. Tergite 6 small, with only 1-2 short setae on the surface. Connexivum between tergites 2 and 6 with 5-6 rows of short setae and one row of 3-4 longer setae posteriorly. Sternite 6 divided into 2 narrow triangular sclerites. Sternite 7 trapezoidal, large, undivided. Genital plate rectangular. New Guinea (Figs. 205, 206). **S. curvata** (p. 137)  
Tergite 2 about as long as the width of tergite 1, with an indentation posteriorly. 8-10 rows of short, thick setae of uniform length on the connexivum between tergites 2 and 6. Tergite 6 larger, as wide as the anal segment, with 8-10 setae on the surface. Sternite 6 undivided, sternite 7 divided into 2 square lateral sclerites. Genital plate triangular. New Guinea, Queensland (Figs. 285, 286). **S. torresi** (p. 180)



23. Tergite 2 with only 6-8 short hairs on the surface along the median dividing line. Tergite 6 large, elliptical, with 2 long and several shorter setae at the posterior margin. Africa (Figs. 294, 295, 305). **S. scissa (Speiser) and subspecies (p. 185)**

The greater median part of tergite 2 covered with short hairs, 20-30 in each half. Tergite 6 very small, rounded, with 2 long setae and 2 short spines posteriorly. Congo, East Africa (Fig. 309). **S. hoogstraali (p. 191)**

A number of species are known in one sex only. Species known from the female only: *S. annandalei*, *S. phthisica*, *S. rotundata*, *S. styligera*. Species known from the male only: *S. brachyacantha*, *S. chinensis*, *S. inopinata*, *S. mindanaensis*, *S. ornata*, *S. tonkinensis*.

NOTE. It is not easy in some cases to decide whether an indentation is present on sternite 5 or not. In some specimens the abdomen is compressed laterally so that the indentation becomes closed. In other cases the indentation is recognizable only by the division of the spines into two groups and lighter pigmentation of the sternite between the groups of spines. Examination of several specimens in alcohol is necessary to decide this point. The indentation is difficult to make out in some specimens in balsam mounts.

### BIARTICULATA GROUP

#### *Stylidia annandalei* (Scott, 1925)

*Nycteribia (Stylidia) annandalei*. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

Length 2 mm. Tibiae  $\frac{2}{3}$  the length of the femora, thorax slightly longer than wide.

*Female abdomen.* Tergite 1 with a marginal row of short hairs. Tergite 2 short, rounded, with 4 long setae in the middle of the posterior margin and shorter setae laterally. Short hairs on the surface. Connexivum between tergites 2 and 6 bare. Tergite 6 elliptical, small, with 3 long setae posteriorly, surface bare. Anal segment with long styles and a few short hairs near their base. 3 long setae at the tip of the styles. Sternite 1+2 small, much narrower than the abdomen. Sternites 5 and 6 with small, lateral sclerites with 3 long setae at the outer corners. Sternite 7 divided into 2 elliptical sclerites. Genital plate not mentioned in the description.

The species has been described from a single female, from *Rhinolophus lepidus*, from Bengal, Manharpur, Singbhum district. The type is lost.

#### *Stylidia biarticulata* (Hermann, 1804)

(Figs. 1, 2, 24, 30, 50, 178-179, 181, 182, 183)

*Phthiridium biarticulatum*. Hermann, 1804, *Mém. Aptèrol.* p. 124.

*Celeripes vespertilionis*. Montagu, 1808, *Trans. Linn. Soc. Lond.* **9**, 166.

*Phthiridium hermanni*. Leach, 1817, *Zool. Misc.* **3**, 55.

*Nycteribia biarticulata* Hermann. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275.

*Stylidia biarticulata* (Hermann). Westwood, 1840, *Introd. modern class. insects*, **2**, 154.

*Nycteribia hermannii* Leach. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Stylidia hermannii* (Leach). Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

*Nycteribia hermanni* Leach. Schiner, 1864, *Fauna Austr.* **2**, 653.

*Nycteribia biarticulata* Hermann. Rondani, 1879, *Bull. Soc. Ent. Ital.* **11**, 9.

*Nycteribia biarticulata* Hermann. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia biarticulata* Hermann. Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 521.

*Nycteribia biarticulata* Hermann. Falcoz, 1924, *Bull. Mus. Hist. Nat.* **30**, 223.

*Nycteribia biarticulata* Hermann. Falcoz, 1926, *Faune de France*, **14**, Paris.

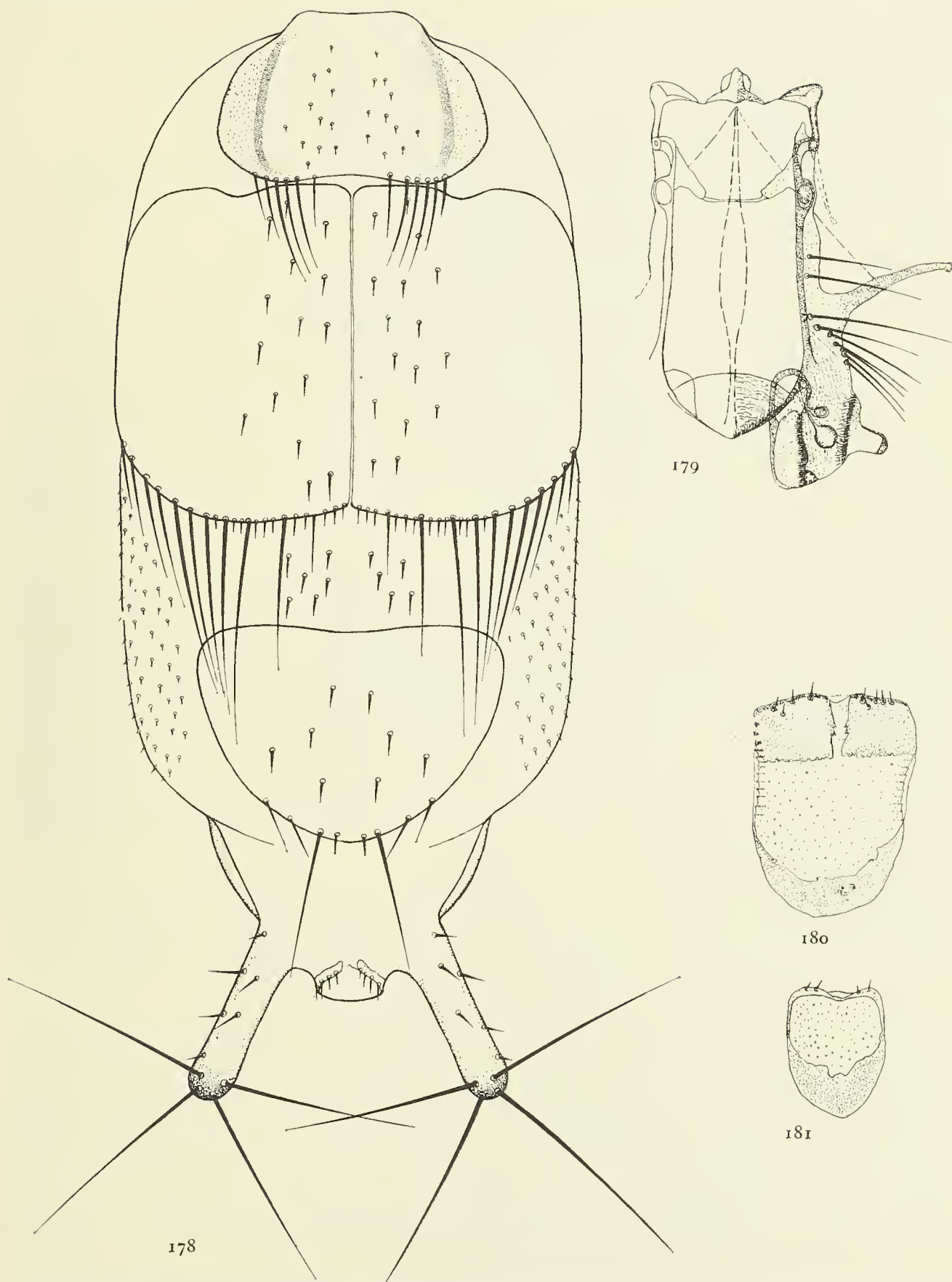
*Nycteribia biarticulata* Hermann. Gil Collado, 1932, *Eos*, **8**, 29.

*Nycteribia biarticulata* Hermann. Corradetti, 1934, *Riv. Malar.* **13**, 338.

*Nycteribia biarticulata* Hermann. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, **17**, 9.

*Nycteribia biarticulata* Hermann. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.





Figs. 178-181. *Stylidia* spp. *Stylidia biarticulata* (Hermann). 178. female abdomen, dorsal; 179. dorsal pattern of thorax; 181. genital plate; *S. biloba* (Theodor & Moscona). Female. 180. genital plate.

- Nycteribia biarticulata* Hermann. Thompson, 1937, *Ent. Monthl. Mag.* **73**, 274.  
*Nycteribia biarticulata* Hermann. Stefanelli, 1942, *Riv. Parassit.* **6**, 25, 61.  
*Nycteribia biarticulata* Hermann. Leclercq & Theodorides, 1950, *Ent. Monthl. Mag.* **86**, 74.  
*Nycteribia biarticulata* Hermann. Aellen, 1952, *Bull. Soc. Sci. nat. Maroc.* **31**, 149.  
*Nycteribia biarticulata* Hermann. Aellen, 1955, *Bull. Soc. Neuchâtel Sci. nat.* **78**, 81.  
*Nycteribia biarticulata* Hermann. Ricci, 1953, *Riv. Parassit.* **14**, 219.  
*Nycteribia biarticulata* Hermann. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.  
*Nycteribia biarticulata* Hermann. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 22.  
*Nycteribia biarticulata* Hermann. Grulich & Povolny, 1955, *Fol. Zool. Ent.* **4**, 111.  
*Nycteribia biarticulata* Hermann. Balcells, 1956, *Speleon*, **6**, 287.  
*Nycteribia biarticulata* Hermann. Hurka, 1958, *Fol. Zool.* **7**, 231.  
*Nycteribia biarticulata* Hermann. Aellen, 1959, *Rev. Suisse Zool.* **66**, 555.

Length 2.5–3 mm. Colour brown.

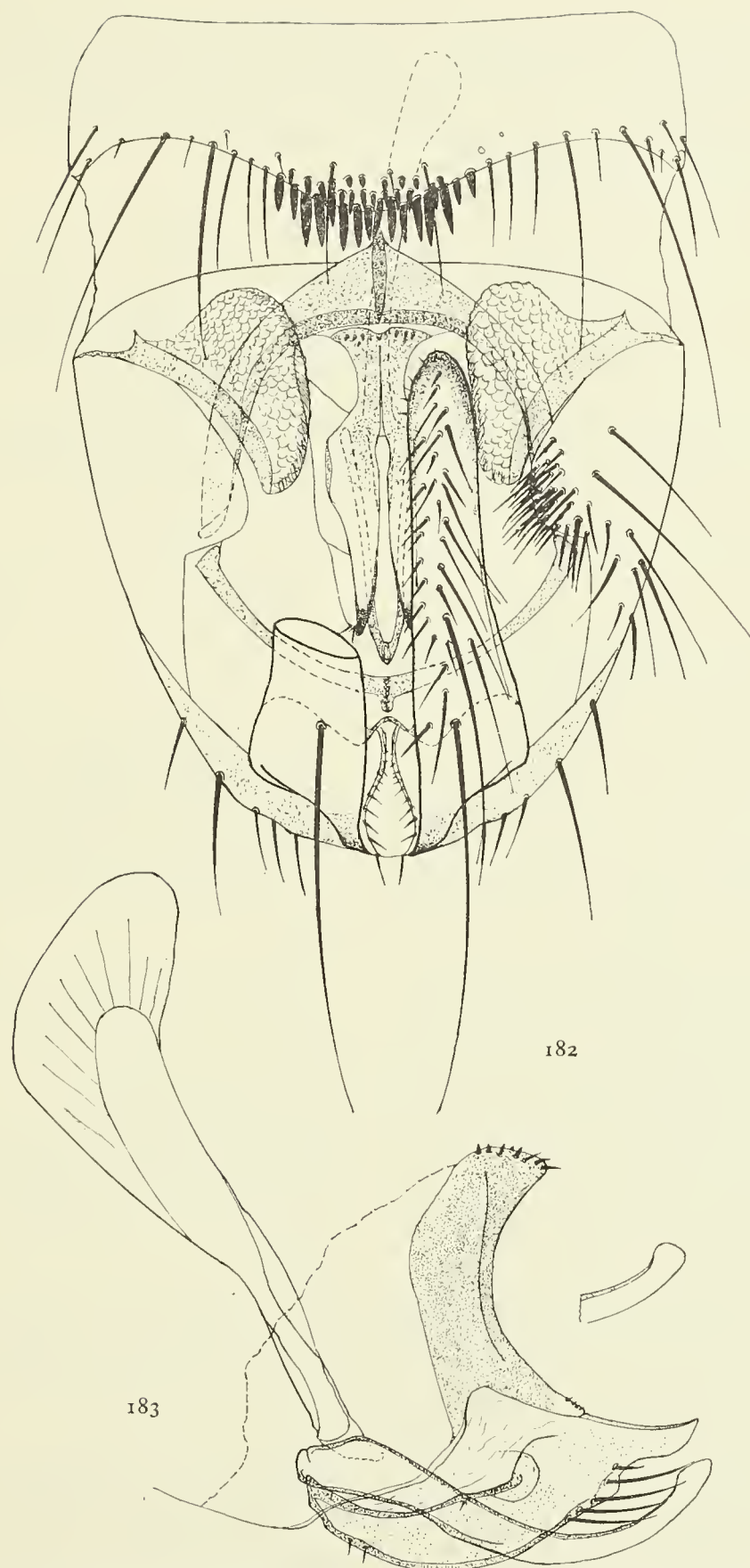
*Head.* Sclerotized nearly up to the anterior dorsal margin which bears 4–6 setae, moderately compressed laterally.

*Thorax.* As long as wide. Oblique sutures forming an angle of  $75^\circ$ . Lateral plates of the notopleural sutures present only in the posterior half. 10–13 notopleural setae which are more widely spaced anteriorly and reach beyond the mesopleural suture half way to the anterior spiracle. Tibiae long and slender, 4.5 to 5 times as long as wide, with 3 rows of setae in the distal half of the ventral edge. The row of setae at the posterior margin of the sternal plate of the thorax consists of 4 setae at each side, one of which is longer than the others.

*Male abdomen.* Tergite 1 with a marginal row of short setae with a gap in the middle. Tergites 2–6 with marginal rows of moderately long and shorter setae and 2–4 longer setae in the marginal rows of tergites 5 and 6. Short hairs on the surface of tergites 2–5, tergite 6 bare. Anal segment wide and rounded posteriorly and with a deep angular incision of the anterior dorsal margin. Abdominal ctenidium with about 45 spines. Sternite 5 with convex posterior margin which bears a group of 4–5 rows of spines, those of the posterior row 4 times as long as those of the anterior row and the others of intermediate length. At the ventral surface of the anal segment, at its basal angles, there are two rounded processes with a reticulated surface, which are situated on a sclerotized band on which they can be moved outwards. Posteriorly to these processes are two rounded bulges thickly covered with setae.

*Genitalia.* Basal arc wide and rounded, with a short anterior process. Claspers thick and straight, with blunt dark ends. Phallobase short, strongly concave dorsally. Aedeagus curved, tapering to a knob-like end. Parameres broad, with a curved apical process and 5–6 short setae at its base. The parameres are partly fused with the phallobase.

*Female abdomen.* Tergite 1 bilobed posteriorly, each lobe with a marginal row of short setae, leaving the median concavity bare. Tergite 2 large, rounded, incompletely divided in the middle, much longer than the width of tergite 1. The marginal row consists of long setae laterally, 6–8 at each side and shorter setae and spines in the middle. A few short hairs along the median line. Connexivum between tergites 2 and 6 bare, except for a group of 8–12 short hairs in the middle. Tergite 6 triangular, with 3–4 long setae at the apex posteriorly and a few short setae on the surface. Anal segment membranous dorsally, with two sclerites ventrally which are prolonged into 2 long styles. These bear 4 long setae at the tip which form a more or less regular cross. A few short hairs at the stem of the styles. Sternites 3 and 4 membranous with marginal rows of uniformly short setae. Sternites 5 and 6 divided into narrow lateral sclerites which



Figs. 182, 183. *Stylidia biarticulata* (Hermann). Male. 182. sternite 5 and genital area; 183. genitalia.



nearly reach the midline and bear 2-3 long vertical setae at the lateral corners. Sternite 7 longer, also divided into lateral sclerites which are roughly triangular and bear 4-5 long setae posteriorly. Genital plate shield-shaped, about  $0.2 \times 0.15$  mm., with a more strongly sclerotized apical margin which projects from the surface. A few minute hairs at its base.

Distribution: Europe, North Africa, West Asia.

MATERIAL IN THE COLLECTION

5 ♂ 6 ♀ given by Kolenati, no locality (Brit. Mus. 1856.163).

PORTUGAL

Sintra, 3.ii. 1896, Col. Yerbury, 3 ♂ 2 ♀.

SPAIN

Burgos, Silor prov., from *Rhinolophus ferrumequinum*, S. Gonzalez, N. C. Rothschild, 4 ♂ (Brit. Mus. 1913.450).

San Feliu de Guixols, Gerona, from *Rhinolophus euryale*, 23.viii. 1952, D. L. Harrison, 1 ♂ (Brit. Mus. 1952.434).

FRANCE

St Génies de Malgoires, Gard, from *Rhinolophus ferrumequinum*, Apr. 1910, 2 ♂ 1 ♀; Jan. 1912, 4 ♂ 9 ♀; 6.ii. 1913, 4 ♂ 3 ♀; 21.xii. 1915, 5 ♂ 6 ♀, N. C. Rothschild; Mar. 1932, A. Hughes, 2 ♂ 1 ♀ (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Rhinolophus euryale*, 8.iii. 1915, N. C. Rothschild, 1 ♂; 9.iv. 1926, 2 ♂; Mar. 1932, 1 ♂; A. Hugues (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Rhinolophus hipposideros*, 1918, A. Hugues, N. C. Rothschild, 1 ♂ 1 ♀; Mar. 1932, A. Hugues, 1 ♀ (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Rhinolophus* sp. 6.iv. 1923, A. Hugues, N. C. Rothschild, 4 ♂ 6 ♀.

St Génies de Malgoires, Gard, from *Myotis capaccinii*, Jan. 1912, N. C. Rothschild, 3 ♂ 7 ♀; Mar. 1932, A. Hugues, 1 ♂ (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Miniopterus schreibersi*, Apr. 1910, 3 ♂ 1 ♀; Dec. 1913, 4 ♂ 3 ♀; 8.iv. 1923, 2 ♂; N. C. Rothschild. Oct. 1926, 1 ♀; Mar. 1932, 1 ♂ 1 ♀, A. Hugues (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Vespertilio* sp., 24.ii. 1912, 1 ♂ 2 ♀; 12.iv. 1923, A. Hugues, N. C. Rothschild, 1 ♂.

Cave de Meaunes, from *Rhinolophus ferrumequinum*, 20.i. 1908, K. Jordan, N. C. Rothschild, 4 ♂ 1 ♀.

Herauld, from *Rhinolophus* sp., Dec. 1926, N. C. Rothschild, 2 ♀.

BRITISH ISLES

Braunton, N. Devon, from *Rhinolophus ferrumequinum*, 12.v. 1912, W. Holland, N. C. Rothschild, 1 ♂ 2 ♀.

Lympsham, Cheddar, Somerset, from *Rhinolophus hipposideros*, 18.viii. 1921 and 25.x. 1921, F. W. Whist, N. C. Rothschild, 2 ♀.

Redd's Cavern, Burrington Combe, Somerset, from *Rhinolophus hipposideros*, 4.i. 1942, G. A. Walton 2 ♂ 3 ♀.

Dundry, Somerset, from *Rhinolophus hipposideros*, Dec. 1922, L. Harrison Matthews, 1 ♂.

Wells Cathedral, Somerset, from *Rhinolophus ferrumequinum*, 12.vi. 1906, A. G. Berry, A. Whitaker, N. C. Rothschild, 2 ♂ 1 ♀.

Wells Cathedral, Somerset, from *Rhinolophus hipposideros*, 19.vi. 1906, A. Whitaker, N. C. Rothschild, 1 ♂.

Bristol, from *Rhinolophus* sp., 1921, H. P. Jones, N. D. F. Pearce, 1 ♂.

Box Common Caves, Nailsworth, Gloucester, from *Rhinolophus hipposideros*, 23.x. 1954, R. S. George, 1 ♀.

Longton, Staffordshire, from *Rhinolophus hipposideros*, Jan. 1914, B. Bryan, N. C. Rothschild, 2 ♂.

ITALY

Toscana, from *Rhinolophus ferrumequinum*, 1915, N. Cimbali, N. C. Rothschild, 7 ♂ 8 ♀.

Toscana, from *Rhinolophus hipposideros*, 1915, N. Cimbali, N. C. Rothschild, 2 ♂.

Massa Marittima, from *Rhinolophus euryale*, 1915, N. Cimbali, N. C. Rothschild, 2 ♂.

Calabria, from *Myotis emarginatus*, 1915, N. Cimbali, N. C. Rothschild, 1 ♀.

CORSICA

Ponte Leccia, Pietralbello Grotte, from *Rhinolophus euryale*, S. Hirst, 2 ♂ (Brit. Mus. 1932.487).

SARDINIA

Oristano, from *Pipistrellus pipistrellus*, A. H. Krausse, N. C. Rothschild, 3 ♂ 4 ♀.

HUNGARY (NOW ROMANIA)

Herculesbad, from *Rhinolophus ferrumequinum*, July 1907, F. J. Cox, N. C. Rothschild, 15 ♂ 15 ♀.

Uj-Moldova, from *Rhinolophus hipposideros*, 1.v. 1910, L. Dionisi, N. C. Rothschild, 7 ♂ 16 ♀.

SWITZERLAND

Cadenazzo, from *Rhinolophus ferrumequinum*, May 1917, K. Jordan, N. C. Rothschild, 2 ♀.

CRETE

Gonia, from *Rhinolophus ferrumequinum*, 23.iii. 1904, D. M. Bate, 1 ♀ (Brit. Mus. 1904.343).

ALGERIA

Guellet Stel, from *Rhinolophus euryale*, 17.iv. 1912, K. Jordan, N. C. Rothschild, 4 ♂ 3 ♀.

Guellet Stel, from *Rhinolophus ferrumequinum*, Oct. 1920, L. G. Seurat, 1 ♂ 3 ♀.

Central Plateau, from *Rhinolophus ferrumequinum*, K. Jordan, N. C. Rothschild, 2 ♀ (Brit. Mus. 1913.450).

# NYCTERIBIINAE

# STYLIDIA

- Hamman Meskoutine, May 1914, from *Rhinolophus hipposideros*, W. Rothschild, K. Jordan, N. C. Rothschild, 7 ♂ 2 ♀.  
Subterranean Lake, Hamman Meskoutine, from *Rhinolophus euryale*, 1.iv. 1913, P. A. Buxton, 1 ♂.
- TUNISIA  
Djebel Gloub, Khroumirie, from *Rhinolophus euryale*, H. G. Kerville, N. C. Rothschild, 5 ♂ 6 ♀.  
Djebel Gloub, Khroumirie, from *Myotis myotis*, H. G. Kerville, N. C. Rothschild, 4 ♂ 1 ♀.
- LEBANON  
Tripoli, from *Rhinolophus ferrumequinum*, Marchese G. Doria, N. C. Rothschild, 3 ♀ (Brit. Mus. 1913.450).
- ISRAEL  
Jerusalem, from *Rhinolophus blasii*, 22.i. 1922, P. A. Buxton, 1 ♂.  
Herzliya, from *Rhinolophus euryale*, 4.viii. 1946, O. Theodor, 1 ♂ (Brit. Mus. 1947.146).
- JORDAN  
Jenin, from *Rhinolophus blasii*, Nov. 1922, P. A. Buxton, 2 ♂.

## OTHER MATERIAL EXAMINED

Austria and Germany, from *Plecotus auritus* and *Rhinolophus hipposideros*. Turkey, from *Myotis daubentoni* and *Rhinolophus ferrumequinum*. Cyprus, from *Rhinolophus euryale*. Israel, about 30 specimens, from *Rhinolophus ferrumequinum*, *R. hipposideros*, *Myotis myotis* and *Miniopterus schreibersi*. Egypt, about 120 specimens, from *Rhinolophus mehelyi*. Morocco, from *Rhinolophus ferrumequinum*.

## HOST SYNONYMY

Name on original label	Current name
<i>Vespertilio ciliatus</i> Blasius.	<i>Myotis emarginatus</i> Geoffroy.
<i>Vespertilio euryalus</i> .	<i>Rhinolophus euryale</i> Blasius.
<i>Vespertilio murinus</i> L. (African records).	<i>Myotis myotis</i> Borkhausen or <i>M. blythi oxygnathus</i> Monticelli.

## *Stylidia biloba* (Theodor & Moscona, 1954)

(Figs. 180, 184-189)

*Nycteribia (Stylidia) biloba*. Theodor & Moscona, *Parasitology*, **44**, 157.

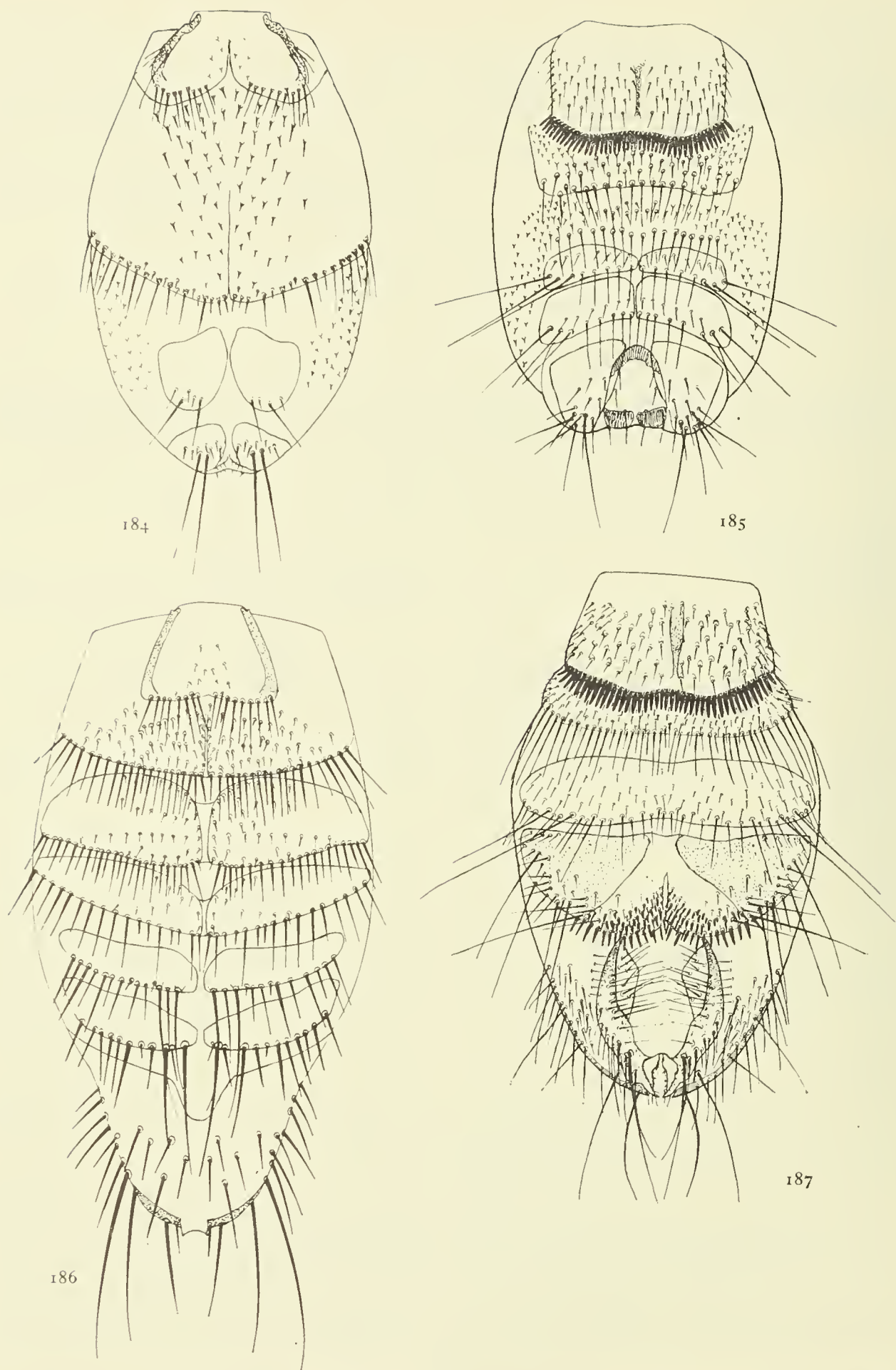
*Nycteribia (Stylidia) biloba* Theodor & Moscona. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 23.

Length 2.75 mm. Colour brown. Head and thorax as in *S. biarticulata* except for minor details.

*Male abdomen*. Tergites all more or less clearly divided in the middle. Tergites 2-4 with marginal rows of short setae and short hairs on the surface. Tergites 5 and 6 with longer setae in the middle and with bare surface. Anal segment short, rounded posteriorly, with a deep indentation of the anterior dorsal margin. Sternite 5 with 2 broad lobes posteriorly, each of which is covered with 4-5 rows of short spines which are longer posteriorly, but not as long as in *S. biarticulata*.

*Genitalia*. Claspers thick, curved, tapering to a long dark point. Parameres with a long, hooked, apical process which is much longer than in *S. biarticulata*, with 5-6 setae ventrally, fused with the phallobase. Aedeagus long, curved, tapering to a rounded point.

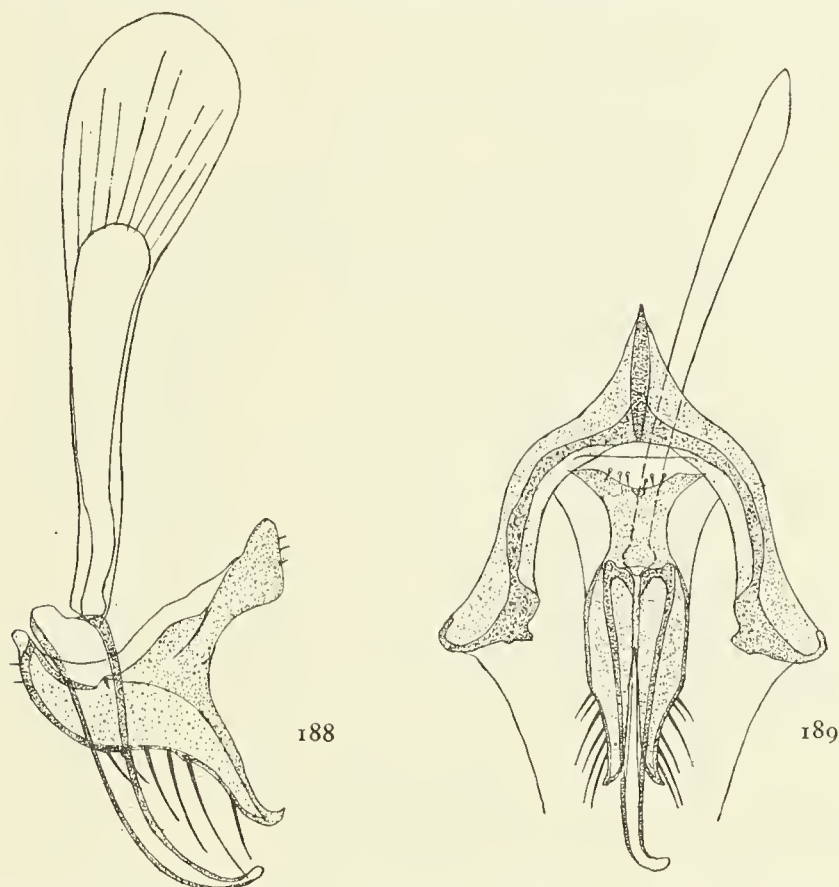
*Female abdomen*. Tergite 1 divided into two lobes posteriorly, each of which bears a marginal row of about 8 setae. The indentation is bare. Tergite 2 very large, incompletely divided in the middle, with a marginal row of moderately long setae laterally, shorter setae and spines in the middle. The middle of the surface is covered with short hairs. Tergite 6 is divided into 2 closely placed, rounded sclerites, each of which bears one or two longer setae and some spines posteriorly. The connexivum between tergites 2 and 6 is bare. Anal segment short, conical, with 2 setae



Figs. 184-187. *Stylidia biloba* (Theodor & Moscona). 184. female abdomen, dorsal; 185. same, ventral; 186. male abdomen, dorsal; 187. same, ventral.



at the tip and some short hairs on the dorsal surface. Abdominal ctenidium with 55 spines. Sternites 5 and 6 divided into lateral sclerites which are placed close together, with a marginal row of setae and 2-3 vertical setae laterally. Sternite 7 divided into two triangular plates with setae posteriorly and short hairs on the surface, which continue into the space between the



Figs. 188, 189. *Stylidia biloba* (Theodor & Moscona). Male genitalia. 188. profile; 189. ventral.

plates. Genital plate very large, shield-shaped,  $0.35 \times 0.27$  mm., with more heavily sclerotized anterior and posterior margin. Some minute hairs at the base.

Distribution: Only known from the type series from Israel.

Type series in the Dept. of Parasitology, Hebrew University, Jerusalem.

#### MATERIAL IN THE COLLECTION

##### ISRAEL

Herzliya, from *Rhinolophus hipposideros*, 12.xi. 1946, O. Theodor, 1 ♂ paratype (Brit. Mus. 1947.146).

#### OTHER MATERIAL EXAMINED

Other specimens were found on *Rhinolophus ferrumequinum*, Jerusalem; on *Miniopterus schreibersi*, Rosh Pinna; and *Myotis* sp., Herzliya.

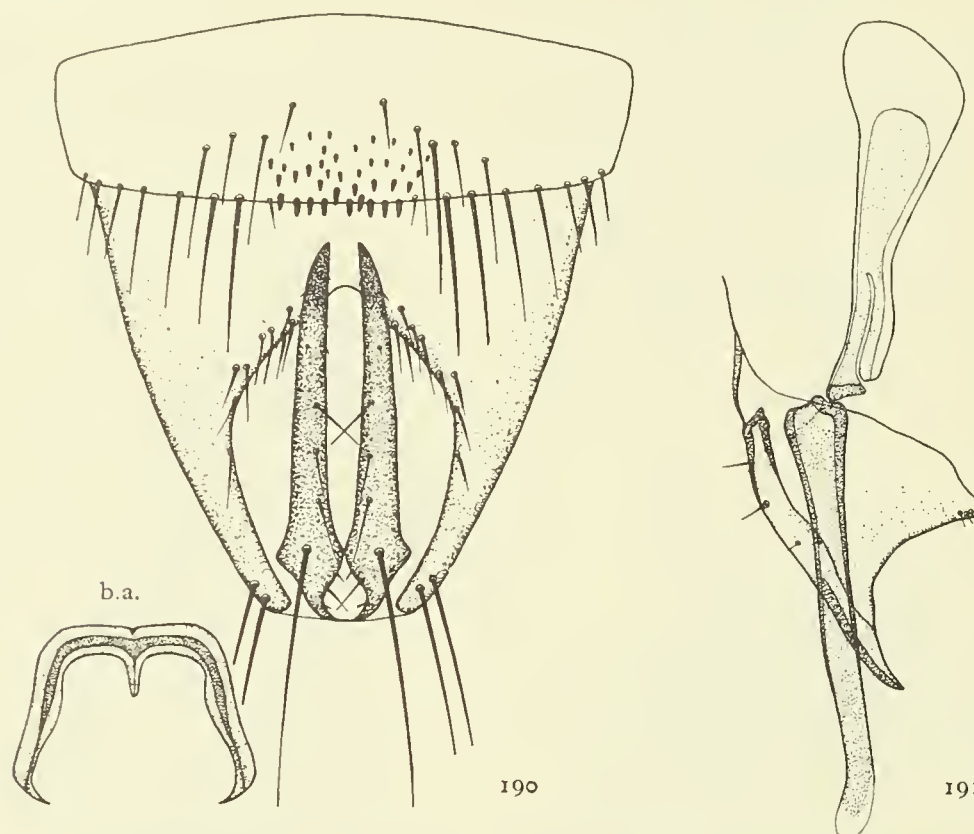
### *Stylidia brachyacantha* (Theodor, 1963)

(Figs. 190, 191, 193)

*Nycteribia* (*Stylidia*) *brachyacantha*. Theodor, 1963, *Fieldiana, Zoology*, **42**, 151.

Length 2.5 mm. Colour brown. Head. Anterior dorsal margin with 6 setae. Labella of the proboscis slightly shorter than the theca.

*Thorax.* Markedly longer than wide. 6–9 notopleural setae. The lateral plates of the notopleural sutures very narrow. Oblique sutures forming an angle of  $60^\circ$ . Thoracic ctenidium with 16 very long, thin spines. Posterior margin of the sternal plate with 3 setae at each side. Tibiae 4 times as long as wide, with 3 rows of setae in the distal part of the ventral edge. Distal end of the tibiae strongly curved.

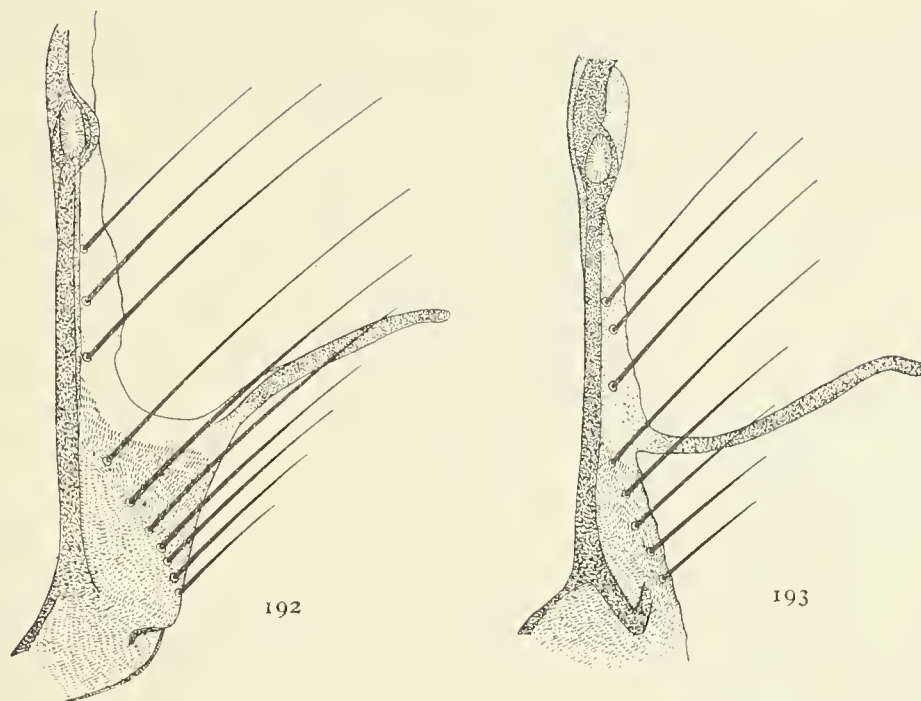


Figs. 190, 191. *Stylidia brachyacantha* (Theodor). Male. 190. sternite 5 and genital area, with basal arc; 191. male genitalia.

*Male abdomen.* Tergite 1 with a row of short spines posteriorly. Tergites 2 and 3 divided in the middle, with marginal rows of moderately long setae. Lateral sclerites of tergites 2 and 3 covered with short hairs in the middle. Tergites 4–6 undivided, concave posteriorly, with similar marginal rows, but with 2 long setae in the middle of the marginal rows. A few hairs on the surface of tergite 4, tergites 5 and 6 bare. Anal segment short, conical, with a deep concavity of the anterior dorsal margin. A transverse row of short setae on the surface and 4 longer setae posteriorly. Sternite 1 + 2 small, with a ctenidium of 40 spines. Sternite 5 with nearly straight posterior margin. 4–6 rows of very short spines in the middle third of the surface, those of the posterior row only slightly longer than those of the anterior rows.

*Genitalia.* Claspers straight, short, with dark points. Basal arc rounded, with a posterior process. Aedeagus straight, slightly conical in the basal half, nearly parallel-sided in the apical half with a rounded tip. Apodeme as long as the aedeagus, with broad end plate. Phallobase concave dorsally. Parameres with long, slender, curved apical process and 3 short hairs near the base, fused with the phallobase.

Female unknown.



Figs. 192, 193. Lateral plate of notopleural suture of: 192. *S. mindanaensis*; 193. *S. brachyacantha*.

PHILIPPINES. Malabatuan, Caburan, Davao, Mindanao, 14.i.1947, H. Hoogstraal. ♂ holotype, Chicago Natural History Museum.

***Stylidia caudata* n.sp.**

(Figs. 194-197)

Length 1.5-1.75 mm. Colour yellowish brown.

*Head.* 4 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax.* As long as wide. Oblique sutures forming an angle of  $75^\circ$ . 10-12 notopleural setae reaching nearly to the anterior spiracle. Posterior margin of the sternal plate with 3-4 setae laterally, one of them long. Tibiae 4-4.5 times as long as wide.

*Male abdomen.* Post-spiracular sclerite with 4 setae, the longest near the spiracle. Tergite 1 with a single marginal row of thin setae. Tergites 2-4 with marginal rows of short setae and thick spines. Tergites 2 and 3 divided in the middle. About 10 short hairs on the surface of tergite 4, more on tergites 2 and 3. Tergites 5 and 6 convex posteriorly, with similar marginal rows and 2 longer setae in the middle of the rows. Surface bare. Anal segment short, nearly cylindrical, rounded posteriorly with a deep concavity of the anterior dorsal margin; a transverse row of short setae across the posterior part of the dorsal surface. Sternite 1+2 with a ctenidium of 35 spines and 2-3 rows of short setae on the surface. Sternites 3 and 4 with moderately long marginal setae. Sternite 5 slightly longer, with convex posterior margin with long setae laterally and shorter setae in the middle, but no group of spines which is present in all other species of the genus. The anal segment has a row of setae at the sides of the ventral surface.

*Genitalia.* Basal arc rounded, with a short anterior process. Claspers short, straight, with a dark blunt end. Aedeagus tapering, curved slightly upwards, with a rounded tip. Parameres



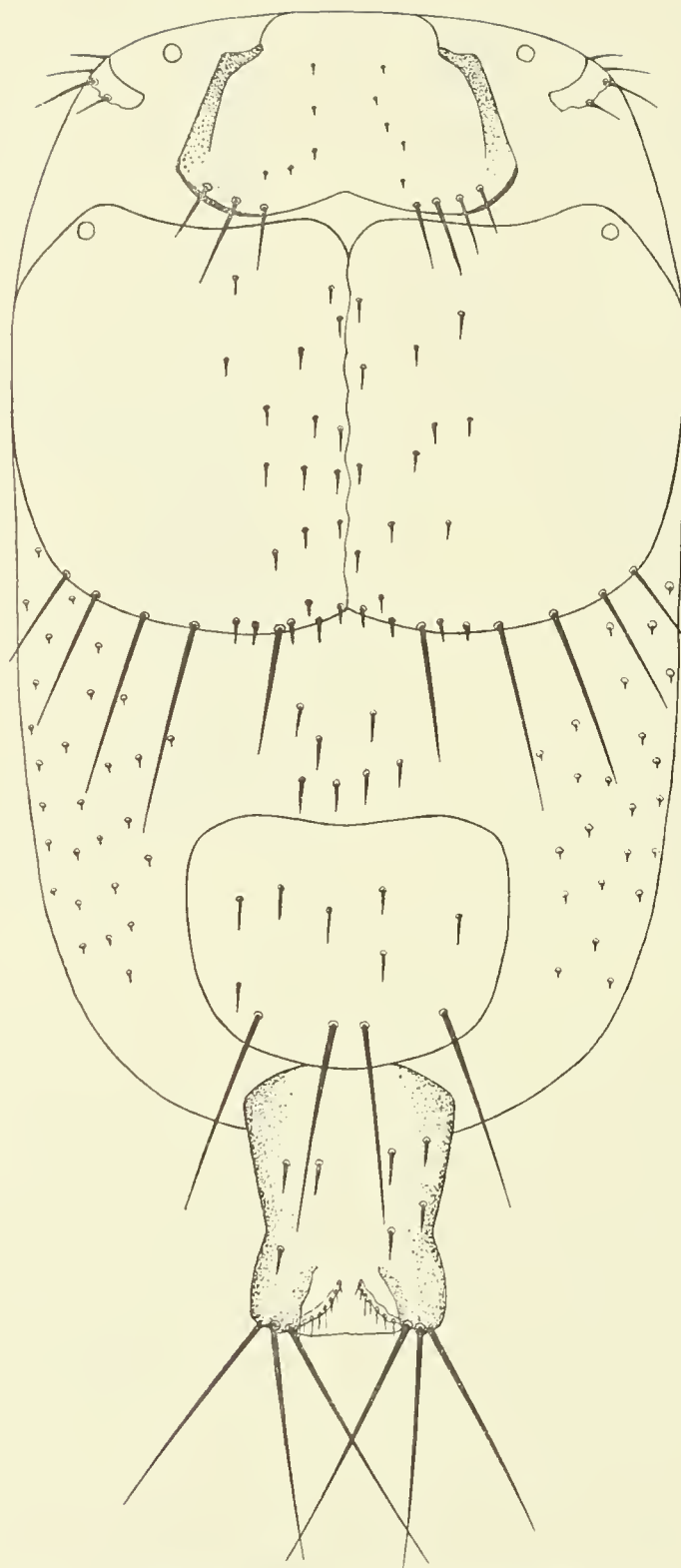
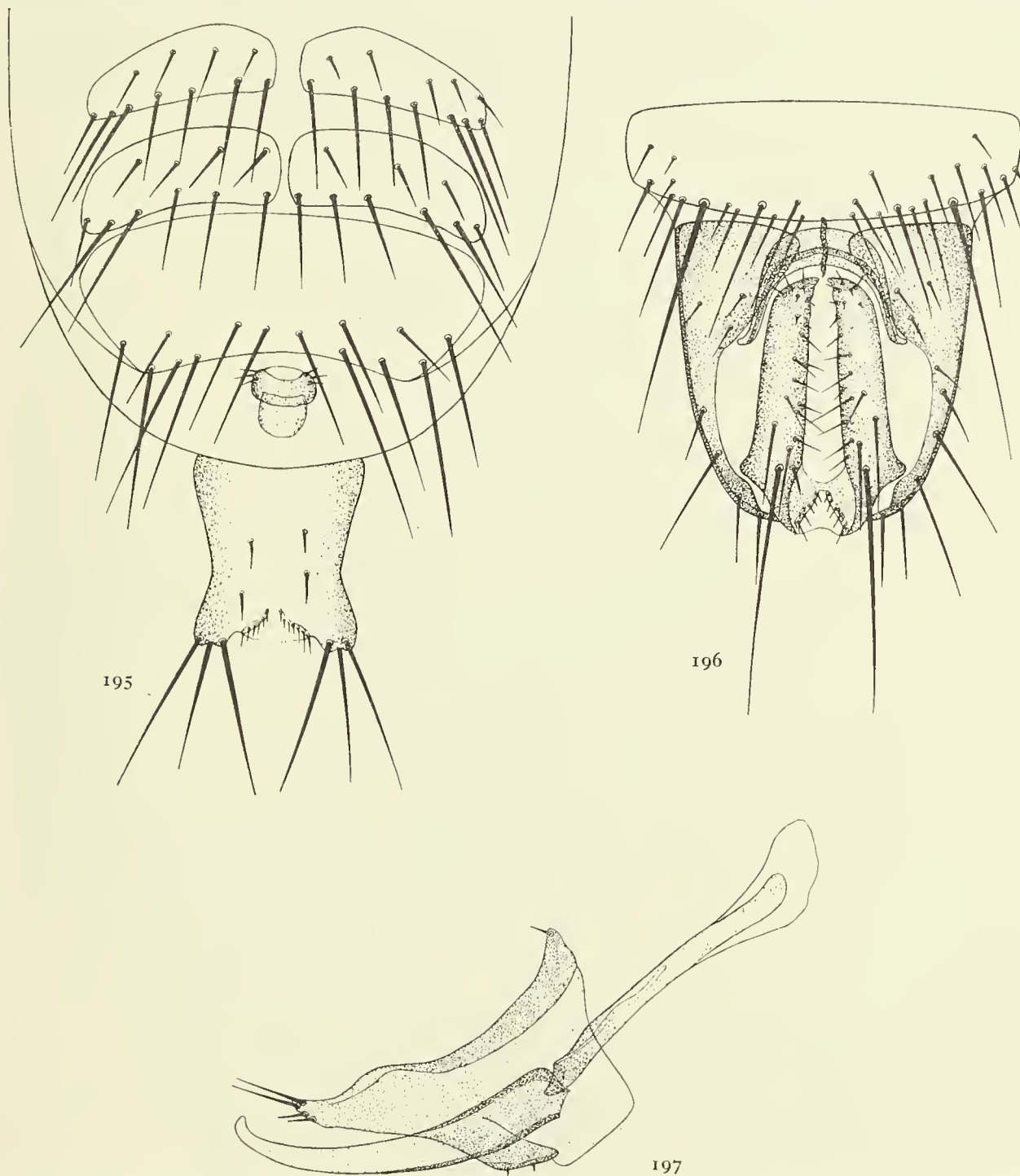


Fig. 194. *Stylidia caudata* n.sp. Female abdomen, dorsal.

triangular with a blunt end which bears 4-5 short setae. Phallobase conical. Apodeme as long as the aedeagus.

*Female abdomen.* Tergite 1 as in the male. Tergite 2 very long, rectangular, divided in the middle, covering nearly half the abdomen, with a marginal row of about 12 setae which are

longer laterally. They are more widely spaced in the middle and alternate here with short spines. There are 2-3 rows of short hairs along the median line. Tergite 6 nearly rectangular, with 4 long setae posteriorly and 4-5 short hairs on the surface. Only 6-8 short hairs on the connexivum



Figs. 195-197. *Stylidia caudata* n.sp. 195. female abdomen, posterior part, ventral; 196. male sternite 5 and genital area; 197. male genitalia.

between tergites 2 and 6. Anal segment short and narrow, parallel-sided, flattened dorso-ventrally. There are 3 long setae at the anal processes and a few spines on the dorsal surface. Sternite 1+2 as in the male. Sternite 3 with moderately long setae in the marginal row and short setae

on the surface. There are 6 long vertical setae on sternite 3, two of which are in the marginal row. Sternite 4 similar, but only with one row of short setae on the surface. Sternites 5 and 6 with elliptical lateral sclerites which reach the midline. They have 3 horizontal setae towards the middle and 3 vertical setae laterally. A transverse row of short vertical setae on the surface. Sternite 7 undivided, with 2 long horizontal setae laterally and a double premarginal row of shorter vertical setae. Genital plate double, consisting of a basal elliptical cover, projecting from the surface, with 3 minute hairs at the base at each side and a shield-shaped plate lying on the surface.

The species differs markedly from other species of the genus in the absence of the armature of spines on sternite 5 of the male, and in the shape of the genital plate in the female.

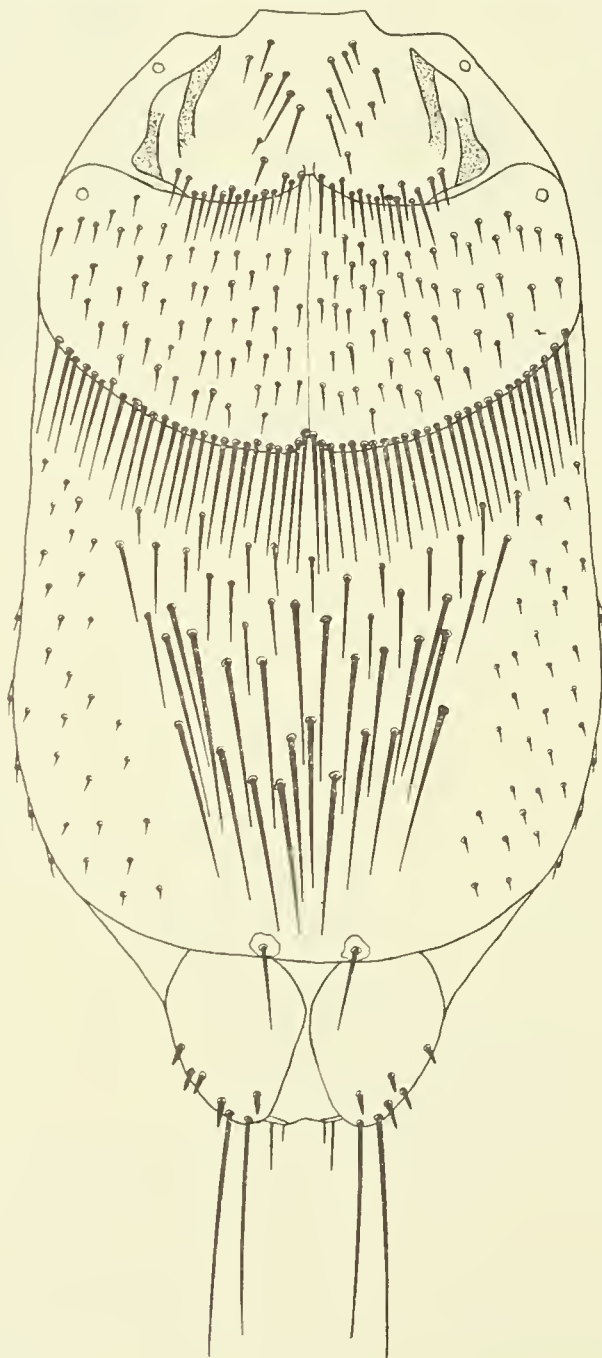
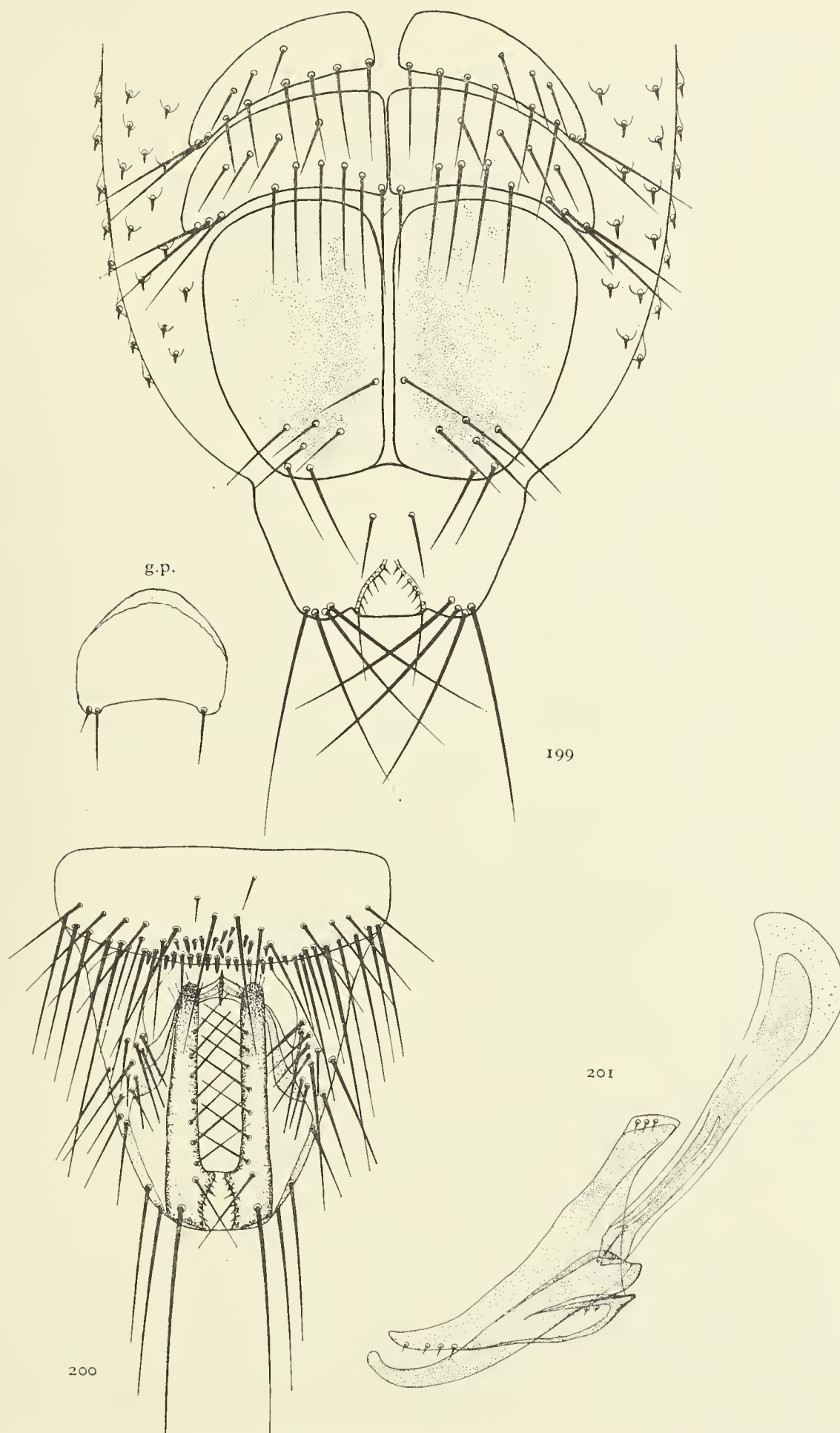


Fig. 198. *Stylidia ceylonica* n.sp. Female abdomen, dorsal.





Figs. 199-201. *Stylidia ceylonica* n.sp. 199. female abdomen, ventral, posterior part, with genital plate; 200. male sternite 5 and genital area; 201. male genitalia.

BURMA. Myitkyina, from *Rhinolophus blythi*, 15.viii.1945 and 23.viii.1945, RT-502, RT-509, ♂ holotype and 2 ♂ 3 ♀ paratypes. Chicago Natural History Museum. Myitkyina, from *Hipposideros gentilis*, 15.viii.1945, 1 ♂, RT-503, R. Traub.

***Stylidia ceylonica* n.sp.**

(Figs. 198-201)

*Nycteribia euxesta* Speiser. Scott, 1914, *Ann. Mag. Nat. Hist.* (8), 14, 209.

Head and thorax as in *S. euxesta*. The spines on the anterior surface of tibia 1 are minute and there are only 2 spines at the ventral edge of coxa 1.

*Male abdomen and genitalia.* Post-spiracular sclerite with 8 long setae (12 in the female). Posterior margin of tergite 1 with a double row of fine setae. Sternite 5 with a triangular group of 28-35 spines in 3 rows. Claspers not darkly pigmented as in *S. euxesta*, only with dark ends. Aedeagus less curved upwards than in *S. euxesta*, with rounded tip. Parameres triangular, without ventral bulge, with 4 short hairs near the tip at the ventral edge.

*Female abdomen.* Tergite 1 with a dense double row of short, thick setae posteriorly. Tergite 2 rounded, large, completely covered with short hairs and with a marginal row of moderately long, closely placed setae of uniform length. Connexivum behind tergite 2 with 2-3 rows of thick, short setae. A group of about 20 long, thick setae in its posterior part, in the middle. Only very short spines on the pleurae. Tergite 6 absent, represented by two isolated setae on a bare area in front of the anal segment. Anal segment short, conical. Lateral sclerites of sternite 5 very short, parallel-sided, curved, with a marginal row of 10 long setae. Sternite 6 with lateral sclerites which are twice as long as those of sternite 5, triangular, with marginal rows of 6 widely spaced setae, short horizontal setae and 3 long vertical setae laterally on the surface. Sternite 7 with 2 elliptical plates which are oblong and much larger than in *S. euxesta*. They bear 2-3 horizontal setae posteriorly and 3-6 vertical setae on the surface. Genital plate wider than long, concave basally, rounded apically, with 2 short hairs at the basal corners.

*S. ceylonica* differs from *S. euxesta* in the male in some details of the genitalia, in the female markedly in the chaetotaxy of the abdomen, in the shape of sternites 6 and 7 and in the shape of the genital plate.

MATERIAL IN THE COLLECTION

CEYLON

Peradeniya, from *Hipposideros lankadiva*, 8.v. 1912, J. C. Fryer, ♂ holotype, 2 ♀ paratypes.

Gonagama, Kitulgala, Kilau valley, 11.v. 1925-7.vii. 1925, W. W. A. Phillips, 2 ♂ 1 ♀.

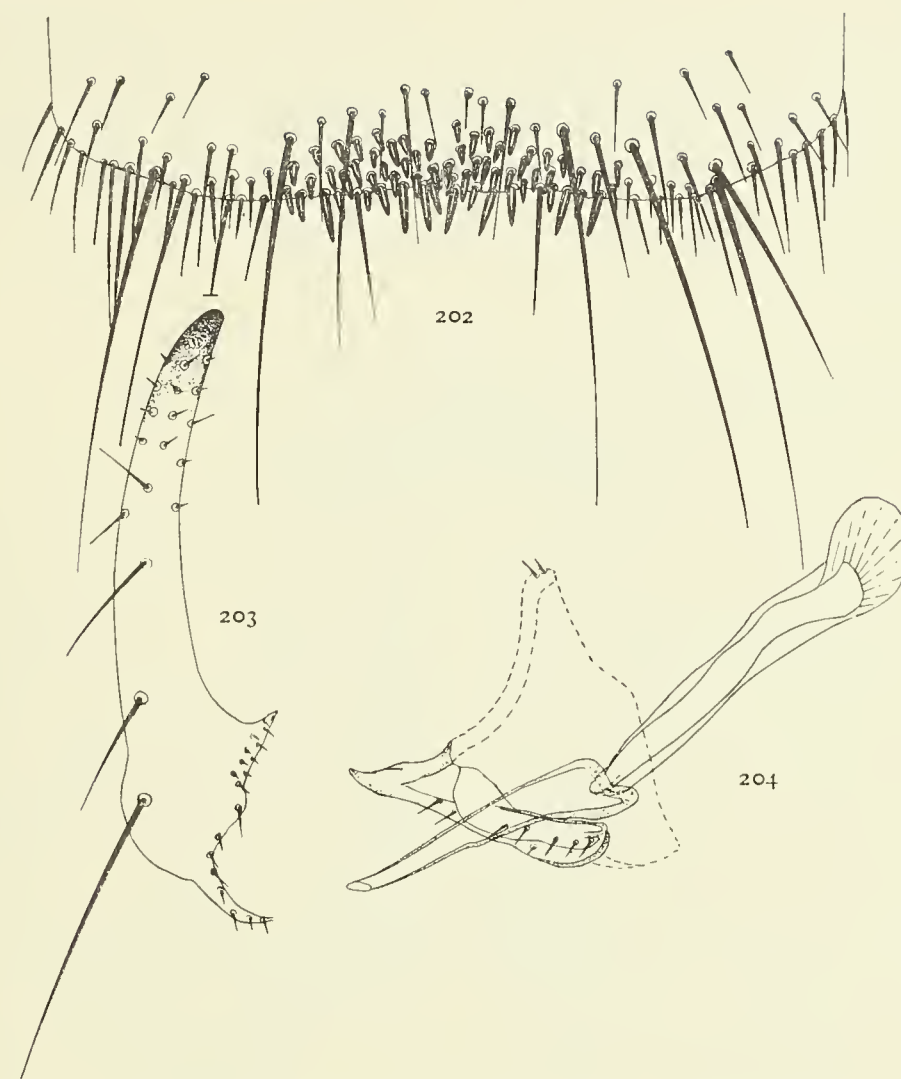
***Stylidia chinensis* (Theodor, 1954)**

(Figs. 202-204)

*Nycteribia (Stylidia) chinensis* Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 24.

Length 2.5 mm. Head and thorax similar to *S. hindlei*. 8-9 notopleural setae.

*Male abdomen.* Dorsal surface similar to *S. hindlei*, but there are only a few hairs on the surface of tergites 2 and 3, which are longer than in *S. hindlei*. Abdominal ctenidium with 42 spines. Sternite 5 with straight posterior margin with about 60 spines in 4-5 rows. 6-8 spines



Figs. 202-204. *Stylidia chinensis* (Theodor). Male. 202. sternite 5; 203. clasper; 204. genitalia.

of the posterior row are twice as long as the others. A rudimentary indentation in the middle of the posterior margin.

*Genitalia.* Claspers slender, slightly curved, with dark tips. Aedeagus straight, tapering to a point. Parameres with short triangular apex.

Female unknown.

CHINA. Yunnan, Ngluko, 7.ii.1929, H. Stevens, ♂ holotype, Chicago Natural History Museum.

### ***Stylidia curvata* n.sp.**

(Figs. 205-208)

Length 2 mm. Colour yellowish brown.

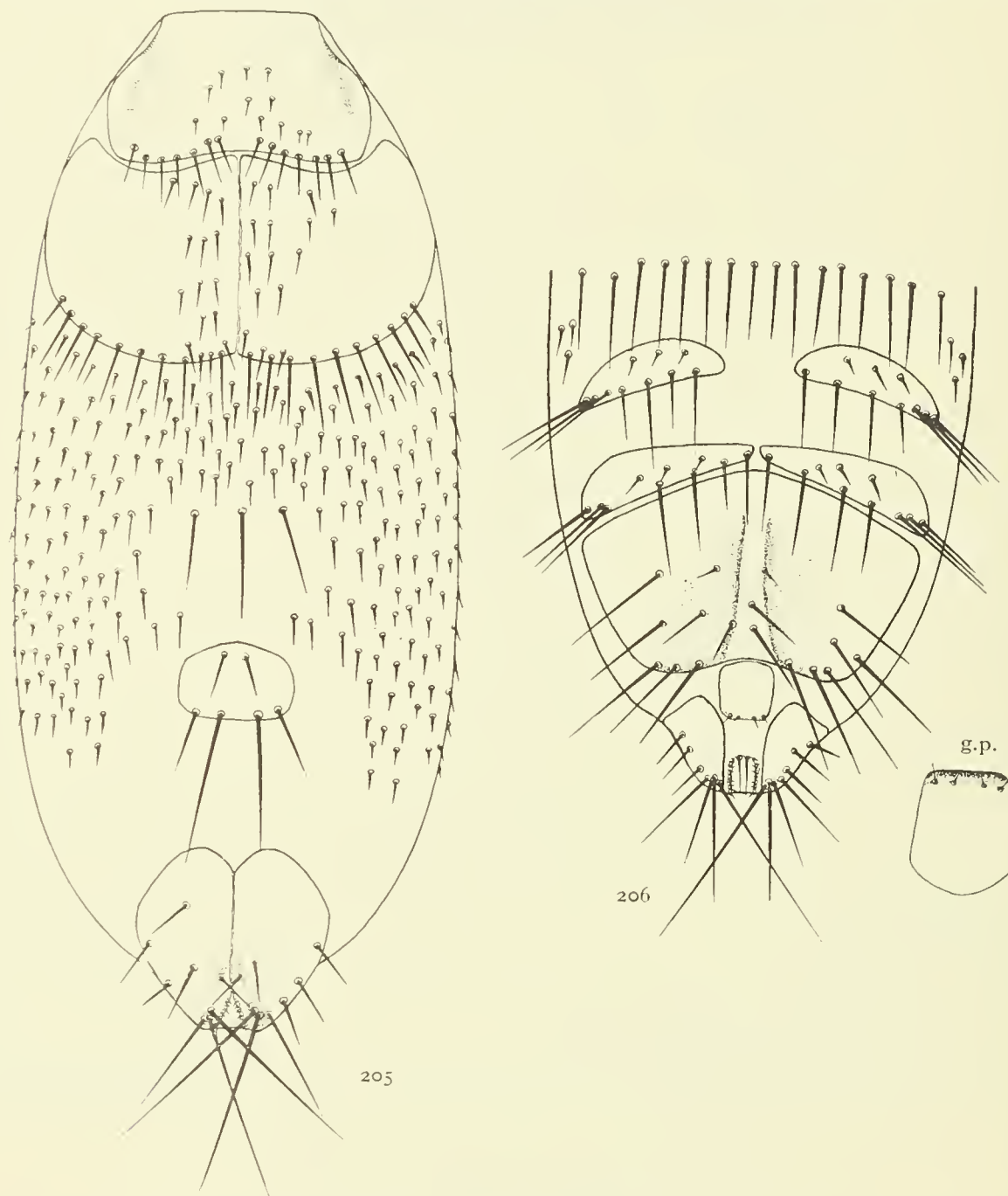
*Head.* Anterior dorsal margin angularly incised and with 2 setae at each side. Labella of the proboscis as long as the theca.

*Thorax.* As long as wide. Oblique sutures forming an angle of about 80°. 3-4 setae at the



posterior margin of the sternal plate at each side. 8 notopleural setae which reach nearly to the anterior spiracle. Tibiae slender, 4.5 times as long as wide.

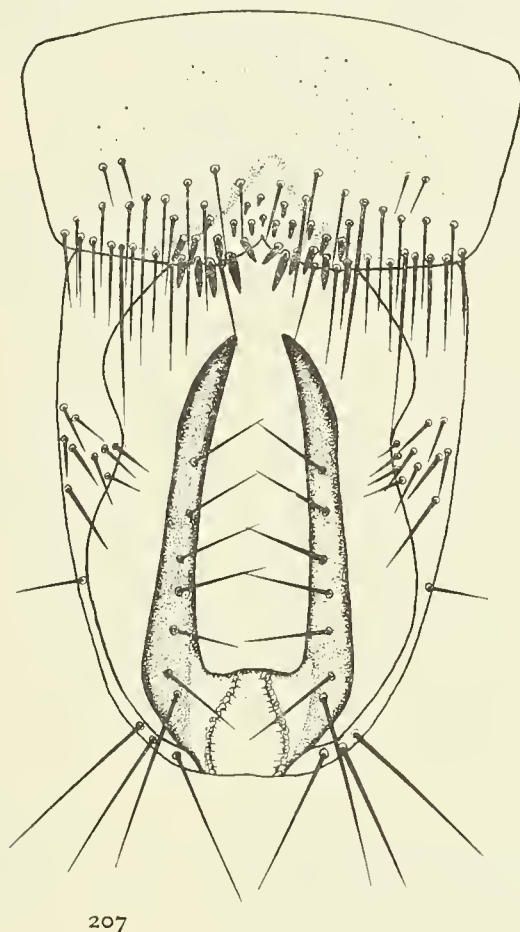
*Male abdomen.* Tergite 1 with a single row of short setae posteriorly. Tergites 2 and 3 divided, with marginal rows of longer setae alternating with shorter ones. The median half of the surface



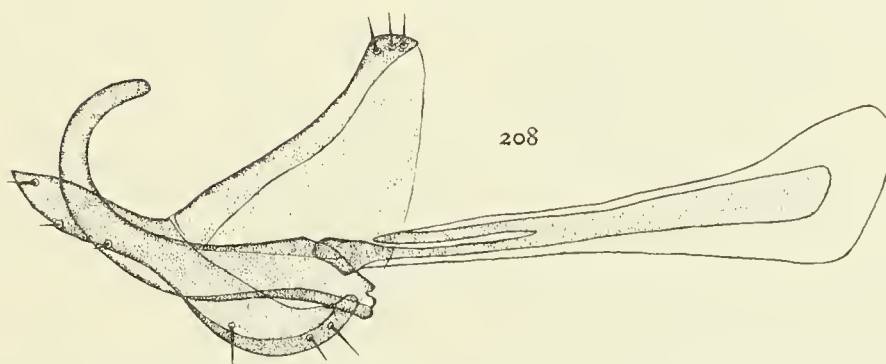
Figs. 205, 206. *Stylidia curvata* n.sp. Female. 205. abdomen, dorsal; 206. same, ventral, posterior part, with genital plate.

covered with short hairs. Tergite 4 incompletely divided, with a similar marginal row and about 10 short hairs on the surface. Tergites 5 and 6 strongly convex posteriorly, undivided, with 2 long setae in the middle of the marginal row and 4-5 hairs on the surface of tergite 5, tergite 6 bare. Anal segment broadly rounded, with a deep angular incision of the anterior dorsal margin.

Abdominal ctenidium with 32-34 spines. Sternites 3 and 4 with marginal rows of long and short setae and with 2 rows of short setae on sternite 3, and one on sternite 4. Sternite 5 longer, with straight posterior margin which has a small indentation in the middle. It bears a triangular group of about 25 short spines in 3 rows with the apex anteriorly. The spines of the posterior



207



208

Figs. 207, 208. *Stylidia curvata* n.sp. Male. 207. sternite 5 and genital area; 208. genitalia.

row are longer than those of the anterior rows. There are long and short setae lateral to the group of spines and a premarginal row of 4 long vertical and several short horizontal setae.

**Genitalia.** Basal arc broadly rounded with long anterior process. Claspers slender, with dark tips, a long seta dorsally near the base and shorter setae up to the middle. Aedeagus slender,

tapering gradually to a rounded tip, very strongly curved, nearly forming a semi-circle. Parameres broad, rounded at the base, with a long, pointed apical process and a few hairs near the tip and at the ventral edge at the base.

*Female abdomen.* Post-spiracular sclerite slender, with 4 setae. Tergite 1 as in the male. Tergite 2 short, rounded posteriorly, with a marginal row of short setae and 2-3 rows of short hairs along the median division line. Connexivum covered with long spines to the posterior margin of tergite 6. There is a row of 3-4 longer setae in front of tergite 6 on a bare area. Tergite 6 small, elliptical, with 2 long vertical setae in the middle of the posterior margin and 2 short setae laterally. 2 short setae near the anterior margin. Anal segment short, wide, conical, not clearly set off from the abdomen, with 3 long setae posteriorly and a few shorter setae on the dorsal surface. Sternite 1 + 2 as in the male. Sternites 3 and 4 membranous, with marginal rows of moderately long setae and 3-4 rows of shorter setae on the surface. 4-6 vertical setae on sternite 3. Sternites 5 and 6 with narrow lateral sclerites which have 4 horizontal setae posteriorly and 3 long vertical setae laterally. The sclerites of the sternites become narrower towards the midline. Sternite 7 longer, trapezoidal, with 2 lateral, nearly square sclerites with 2-3 long setae posteriorly at the sides and several shorter vertical setae on the posterior part of the surface. Genital plate oblong, rounded and wider posteriorly; 4 minute hairs at the base.

NEW GUINEA. Misima Island, from *Hipposideros* sp. no. 14088, 23.vii.1956, ♂ holotype, ♀ paratype. Same data, *Hipposideros* sp., no. 14232, 1 ♀ paratype. Chicago Natural History Museum.

AUSTRALIA. Cape York, Queensland, from *Rhinolophus megaphyllus ignifer*, June 1932, P. J. Darlington, 1 ♂.

### ***Stylidia euxesta euxesta* (Speiser, 1901)**

(Figs. 209-211)

*Penicillidia euxesta*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

nec *Nycteribia euxesta* Speiser. Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209 (refers to *S. ceylonica*).

*Nycteribia euxesta* Speiser. Scott, 1925, *Rec. Ind. Mus.* **27**, 351. (These records may refer to *S. euxesta siamensis* or to *S. euxesta* subsp. ?)

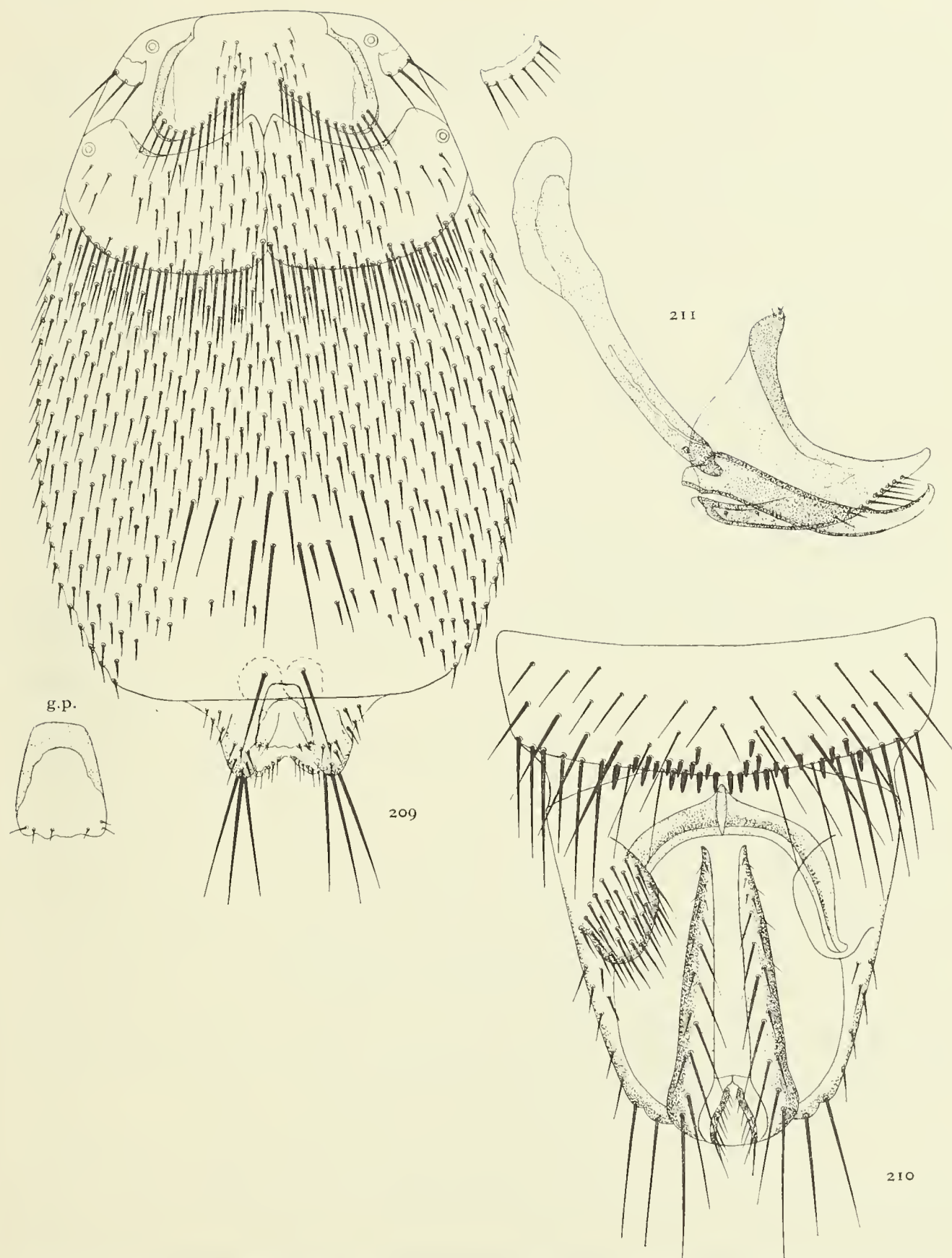
nec *Nycteribia euxesta* Speiser. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479 (refers to *S. ceylonica*).

The specimens from Ceylon previously considered as *S. euxesta* (Scott, 1914, 1936) are here described as a new species, *S. ceylonica*. *S. euxesta* is so far known only from Burma, and perhaps from Assam. A different subspecies occurs in Thailand and Malaya and possibly a second subspecies in the Orissa province in India.

Length 3 mm. Colour brown. 2 setae at the anterior dorsal margin of the head. Labella of the proboscis as long as the theca. 2 short setae on the genae.

*Thorax.* As long as wide. Mesonotum narrow, parallel-sided. 9-10 notopleural setae reaching anteriorly halfway between the mesopleural suture and the anterior spiracle. Thoracic ctenidium with 20-22 spines. The anterior coxae twice as long as wide, with 4 spines at the ventral edge. Tibiae 4.5 times as long as wide. A group of about 20 minute spines at the anterior surface of tibia 1. Three rows of setae in the distal half of the ventral edge. The posterior row of setae on the sternal plate of the thorax consists of 6 setae at each side, 2 long and 4 short.





Figs. 209-211. *Stylidia euxesta* (Speiser). 209. female abdomen, dorsal, with genital plate; 210. male sternite 5 and genital area; 211. male genitalia.

*Male abdomen.* Post-spiracular sclerite curved, with 6 long setae. Tergite 1 concave posteriorly, with a double row of setae. Tergite 2 with a marginal row of closely placed setae of uniform length. Surface covered with short setae except in the lateral quarters. Tergite 3 similar, but the marginal setae are more widely spaced. Tergite 4 similar, but only with about 10 hairs on the surface. Tergites 5 and 6 with similar marginal rows, but the median setae are longer and there are only a few hairs on the surface. Posterior margin of tergite 6 convex. Anal segment conical, with a double row of short setae in the middle and 4 long setae posteriorly at each side. Sternite 1 + 2 short, rectangular, with 2 rows of short setae in the middle and 3-4 rows laterally. Ctenidium with 50 long spines. Sternites 3 and 4 with marginal rows of short, thick setae and premarginal rows of 4-6 long setae. 2-3 rows of short setae on the surface. Sternite 5 longer, convex posteriorly, with a similar marginal row and a group of 20-22 short spines in 2-3 rows in the middle of the posterior margin. Anal segment with a deeply incised anterior dorsal margin. There are 2 bulges near the base on the ventral side which are thickly covered with setae.

*Genitalia.* Basal arc large, rounded, with a short anterior process. Claspers straight, darkly pigmented. A long seta dorsally near the base and shorter setae to near the tip. Phallobase fused with the parameres which have a moderately long apical process with a blunt tip and a ventral bulge with about 10 closely placed setae in the distal part of the ventral edge. Aedeagus tapering, curved upwards to a sharp point which may be slightly curved backwards. Apodeme long with a moderately long end plate.

*Female abdomen.* Tergite 1 deeply concave posteriorly, the marginal row of short setae with a gap in the middle and the setae placed more closely laterally. Tergite 2 longer, with a dense marginal row of moderately long, thick setae, incompletely divided in the middle. Surface covered with strong spines in its greater part except laterally. Connexivum behind tergite 2 covered with short, thick setae and 1-2 rows of longer setae in the posterior part in the middle. Tergite 6 indicated by a bare area with 2 long setae, each placed on a slightly sclerotized base. Anal segment short, rounded, with short setae on the dorsal surface and 3 long setae at the anal processes. Sternite 1 + 2 as in the male, sternites 3 and 4 membranous, ill-defined, thickly covered with setae like those on the dorsum. There are 4 long vertical setae on sternite 3 and two wider apart on sternite 4. Sternites 5 and 6 with narrowly triangular lateral sclerites which reach to the midline, with marginal rows of long setae and short setae on the surface. There are 3 vertical long setae in the lateral corners. Sternite 7 with 2 lateral sclerites which are about as long as sternites 5 and 6 together, with a double row of 3 vertical and 1-2 horizontal setae posteriorly and a few short ones on the surface. Anal segment short, with several short setae dorsally and with a single short seta on the ventral side. Genital plate oblong, narrower posteriorly, with 6 short hairs near the base.

Distribution and host: Burma, possibly Assam, from *Hipposideros armiger*.

#### MATERIAL EXAMINED

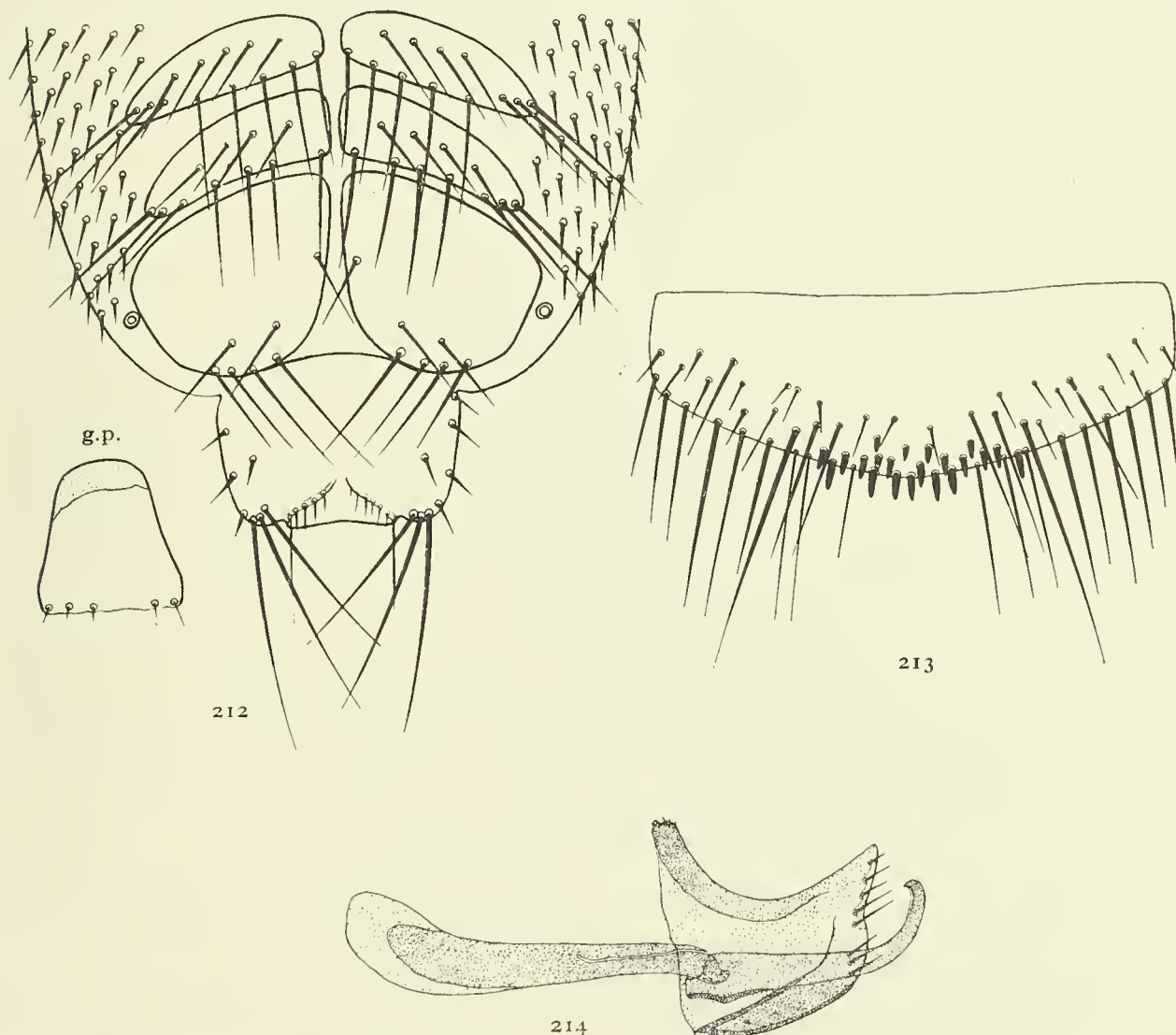
##### BURMA

Myitkyina, from *Hipposideros pomona gentilis*, 23.viii. 1945, R. Traub, 2 ♂ 1 ♀. RT-507-508.

*Stylidia euxesta siamensis* n.subsp.

(Figs. 212-214)

Specimens from Thailand and Malaya differ constantly from the typical form in a number of details. They are smaller, the marginal row of tergite 1 of the male is single, the group of spines on sternite 5 consists of only 15-17 spines and the basal spines are shorter. The aedeagus is shorter and the parameres have only 6-7 hairs on the ventral edge. In the female, the marginal row of tergite 1 is single and the genital plate is of a more triangular shape.



Figs. 212-214. *Stylidia euxesta siamensis* n.subsp. 212. female abdomen, ventral, posterior part, with genital plate; 213. male sternite 5; 214. male genitalia.

## THAILAND

## MATERIAL IN THE COLLECTION

Chiengelow Caves, Chiang Mai, May 1914, N. C. Rothschild, ♂ holotype, 2 ♂ 2 ♀ paratypes.\*

\* Between 1913 and 1914 J. E. Dagleish collected bats in the Chiengelow Caves which he passed on to the British Consul, T. H. Lyle, who in turn sent them to Oldfield Thomas at the British Museum. He also forwarded parasites from these bats to N. C. Rothschild. The bats consisted of only four species: *Hipposideros armiger*, *Hipposideros lylei*, *Hipposideros larvatus* and *Lyroderma lyra*. These species therefore include the host of *S. euxesta siamensis* which is most probably *H. larvatus*, since this is the only bat with a 1914 date.

It should be noted that the caves are sometimes referred to as Chiengelow and at other times as Chiendow or Chiengdao, and in the mid-century edition of the *Times Atlas* they were referred to as Bang Chieng Dao, placed 50 miles or so from Chiang Mai (= Chiengmai) alongside the northbound road in northern Thailand. M. R.



## OTHER MATERIAL EXAMINED

## MALAYA

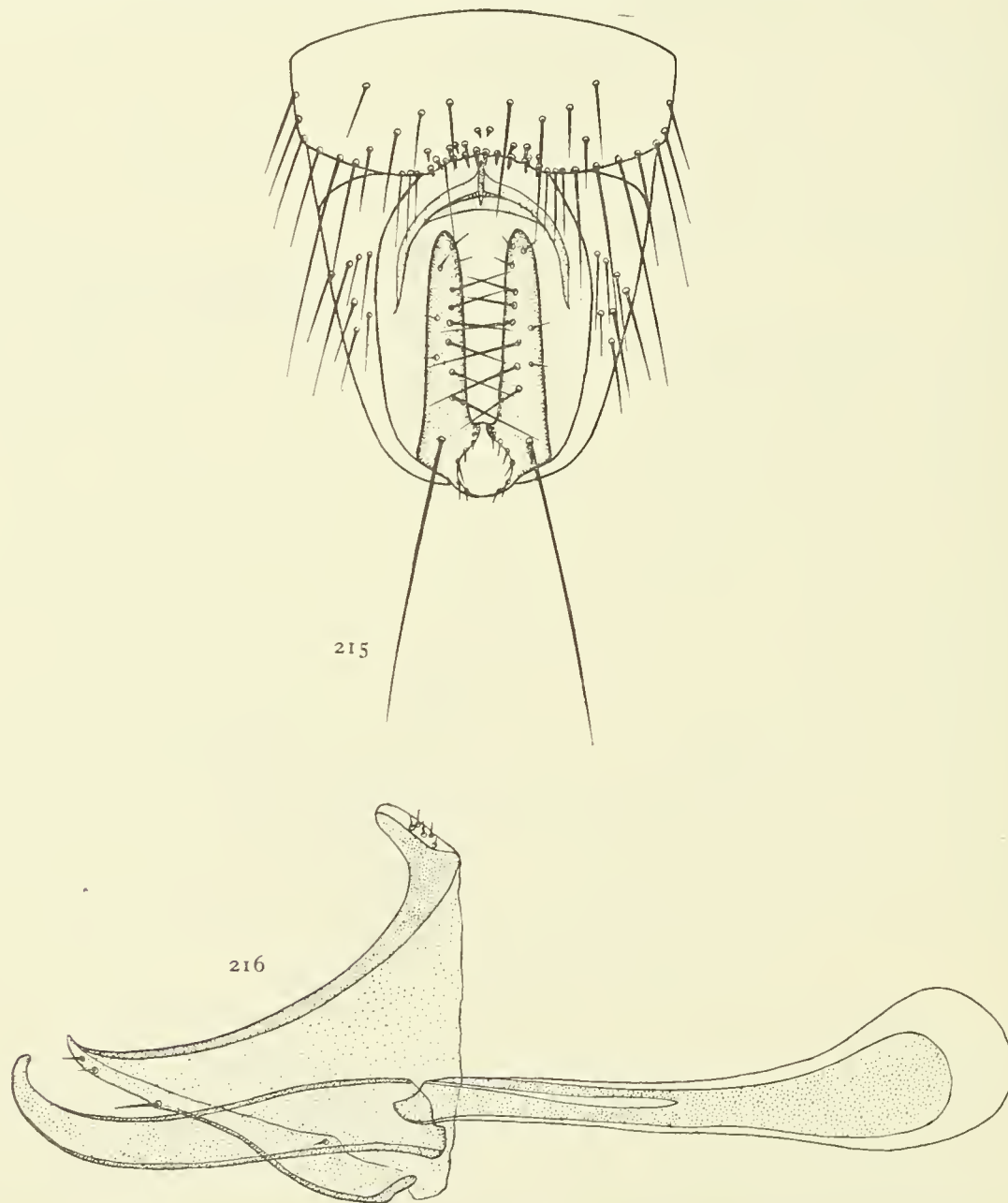
Kedah, from *Hipposideros* sp., 4.ii. 1952, R. Traub, 4 ♂ 4 ♀, B-22872-22877. U.S. National Museum.

***Stylidia euxesta* subsp. ?**

(Figs. 215, 216)

*Stylidia euxesta* Speiser. Scott, 1925, *Rec. Ind. Mus.* 27, 351.

A male from Orissa province in India differs both from *S. euxesta* and from *S. euxesta siamensis* in a number of details. The group of spines on sternite 5 consists of 23 spines which are much shorter than in the other two forms. The claspers are less pigmented, they have dark ends only. The parameres have a less strongly curved ventral margin, a more sharply pointed tip and only 4 short hairs at the ventral edge near the tip.



Figs. 215, 216. *Stylidia euxesta* subsp. ? Male. 215. sternite 5 and genital area; 216. genitalia.

The position of this form will have to be determined when more material of both sexes becomes available.

## MATERIAL IN THE COLLECTION

## INDIA

Khandgiri, Puri district, Orissa, from *Rousettus leschenaulti*, 7.-8.xi.1912, F. G. Gravely, ex coll. Indian Museum, 1 ♂.

NOTE. Examination of the types of *Stylidia euxesta* in the Museo Civico di Storia Naturale, Genoa, since the catalogue went to press showed that the species considered here as *S. euxesta* is not that species. *S. euxesta* is a larger species, closely related to *S. incisa* described here and this may prove to be synonymous with *S. euxesta*. The species considered here as *S. euxesta* and its subspecies will have to be renamed.

***Stylidia fraterna* n.sp.**

(Figs. 217-219, 290)

This species is closely related to *S. traubi* together with which it occurs. The description gives the main differences from *S. traubi*.

Labella of the proboscis slightly shorter than the theca. Thorax as in *S. traubi*. Tibiae 4.5 times as long as wide, the apical end more pointed than in *S. traubi*.

*Male abdomen.* Tergite 1 with longer and thinner setae than in *S. traubi*. Tergite 2 with both halves reaching the midline, without a membranous strip between them and with only about 10 hairs on the surface. Sternite 5 with a much larger, rounded notch with a wider opening; 2 groups of about 20-30 spines in 3-4 rows at each side of the notch, those of the posterior row not much longer than those of the anterior rows. A thickening of the integument at the anterior margin of the notch.

*Genitalia.* Aedeagus straight, tapering to a blunt point, wider at the base than in *S. traubi*. Parameres with a short and pointed apical process.

*Female abdomen.* Marginal setae of tergite 1 longer and thinner than in *S. traubi*. The spines of the connexivum behind tergite 2 are longer in the middle and longest in front of tergite 6. They become much shorter laterally and reach posteriorly beyond the hind margin of tergite 6. Tergite 6 longer than in *S. traubi*, with 2 long, vertical setae in the middle of the posterior margin and some horizontal setae laterally. Sternite 7 with a deep, angular concavity in the posterior margin. Genital plate small, triangular.

MALAYA. Selangor, Bukit Lagong Forest Reserve, from *Hipposideros* sp., 10.iii.1950, R. Traub, ♂ holotype, ♀ paratype. RTB-9394-95, 1 ♀ paratype, RTB-5014. Chicago Natural History Museum.

Same data, 25.ii.1952 and 17.iii.1952, 1 ♂ 1 ♀, paratypes, RTB-22885, RTB-22897.

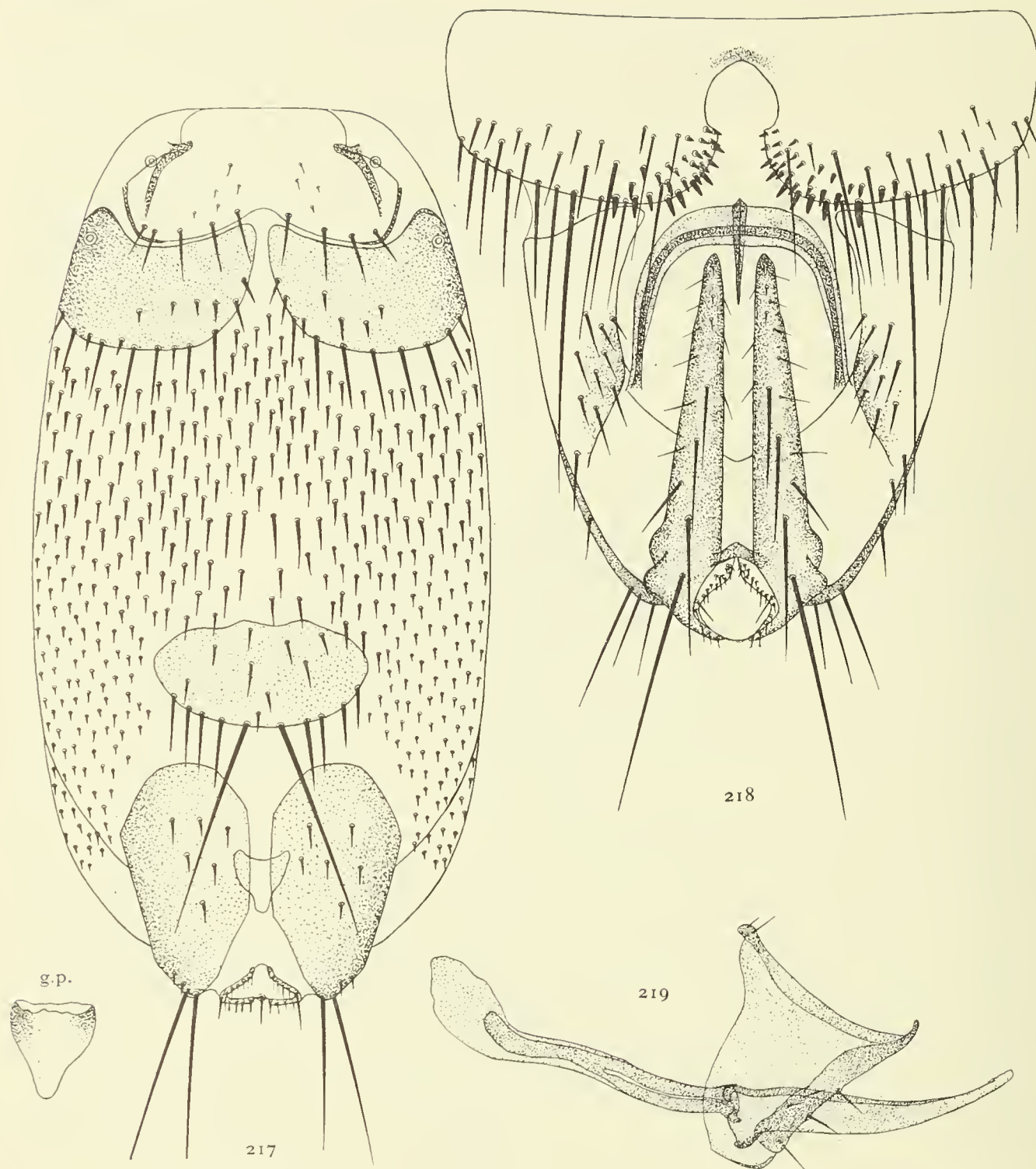
Selangor, from Mouse deer, 5.x.1953, 5 ♀ paratypes, U.S. National Museum, RTB-30082.

THAILAND. Kana Chanaburi, Trakhanun, Hinlaem, from cave bats, 2.xi.1952, R. E. Elbel, 1 ♂. RTB-15832.

## MATERIAL IN THE COLLECTION

## MALAYA

Selangor, Bukit Lagong Forest Reserve, from *Hipposideros* sp., 1 ♀ paratype.



Figs. 217-219. *Stylidia fraterna* n.sp. 217. female abdomen, dorsal, with genital plate; 218. male sternite 5 and genital area; 219. male genitalia.

***Stylidia hindlei* (Scott, 1936)**

(Figs. 220-223)

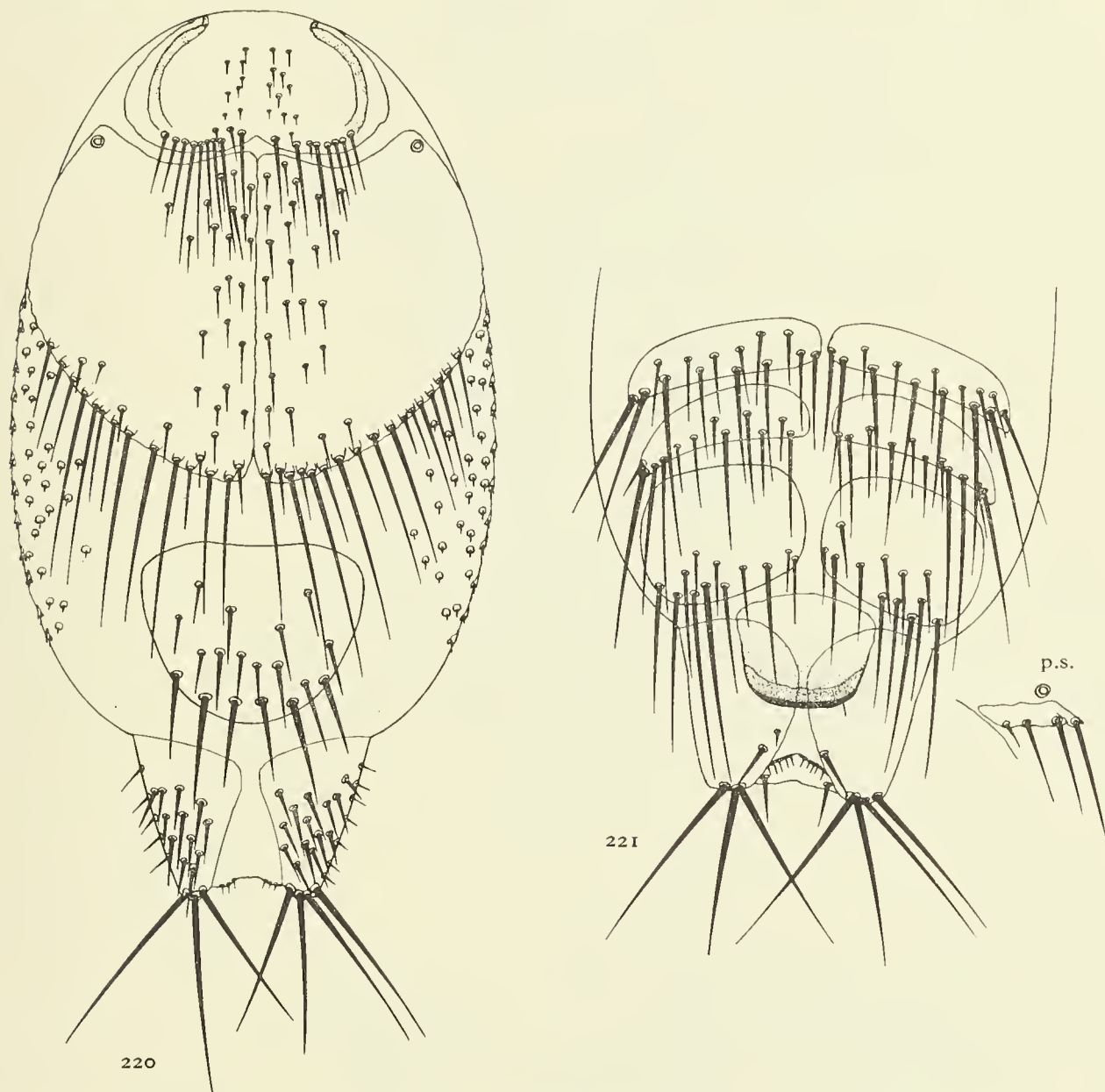
*Nycteribia hindlei*. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479.

*Nycteribia hindlei* Scott. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 24.



Length 2.5–3 mm. Colour brown. Head with 6 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca. Thorax as long as wide. 9–12 notopleural setae. Oblique sutures forming an angle of  $75^{\circ}$ .

*Male abdomen.* Tergites 2–4 with marginal rows of short setae and large groups of short



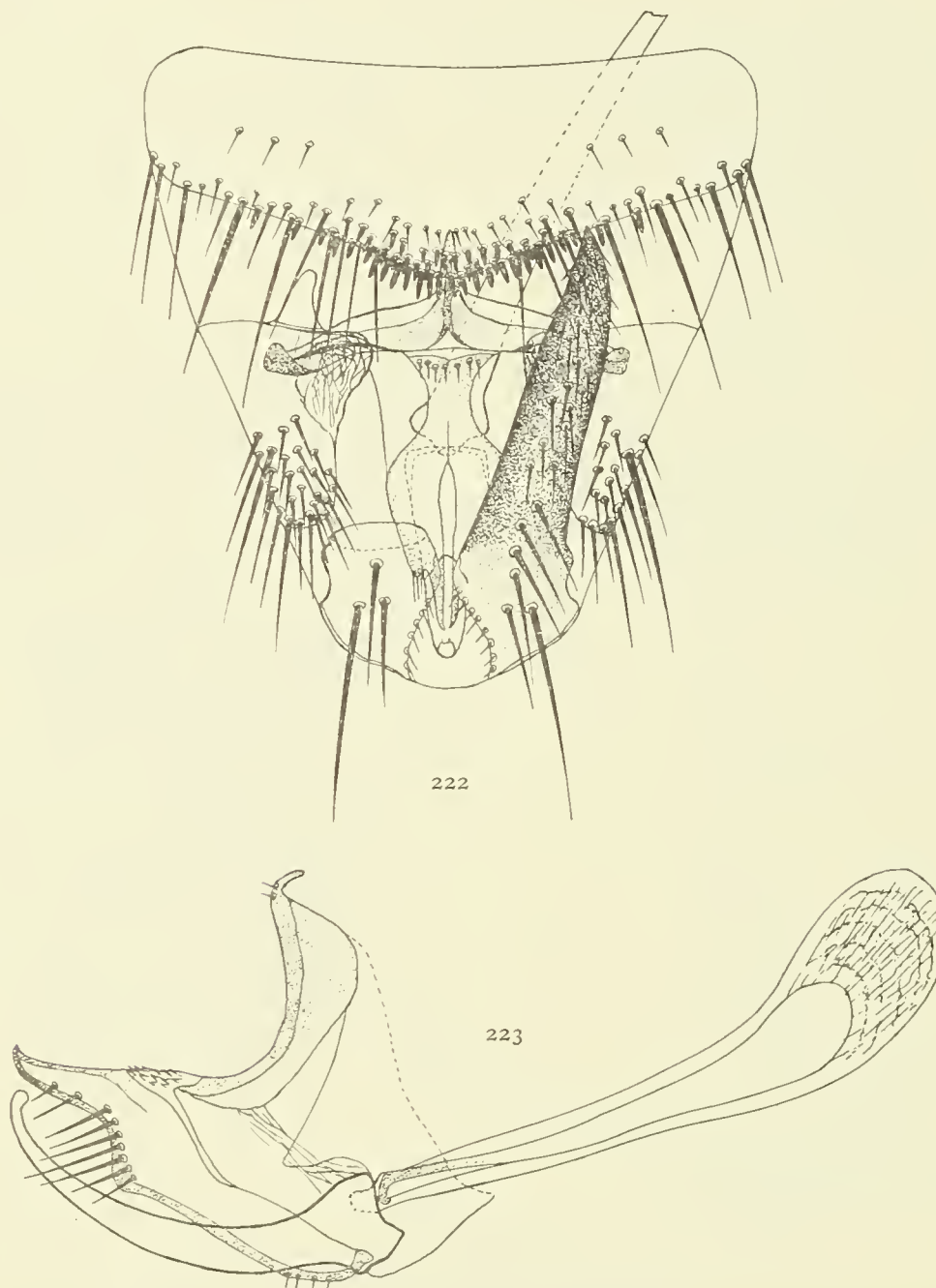
Figs. 220, 221. *Stylidia hindlei* (Scott). Female. 220. abdomen, dorsal; 221. same, ventral, posterior part, with post-spiracular sclerite.

hairs on the surface. Tergites 5 and 6 with strongly convex posterior margin and 4 longer setae in the middle of the marginal rows. Surface bare, except for a few hairs on tergite 5. Anal segment short, rounded, with an angular incision of the anterior dorsal margin. Sternite 1 + 2 with a ctenidium of 50 spines. Sternite 5 with a group of about 35 spines in 3 rows at the convex posterior margin. The posterior row consists of longer spines and reaches further laterally.

*Genitalia.* Claspers thick, straight, black, with a short point. Aedeagus curved, tapering to a

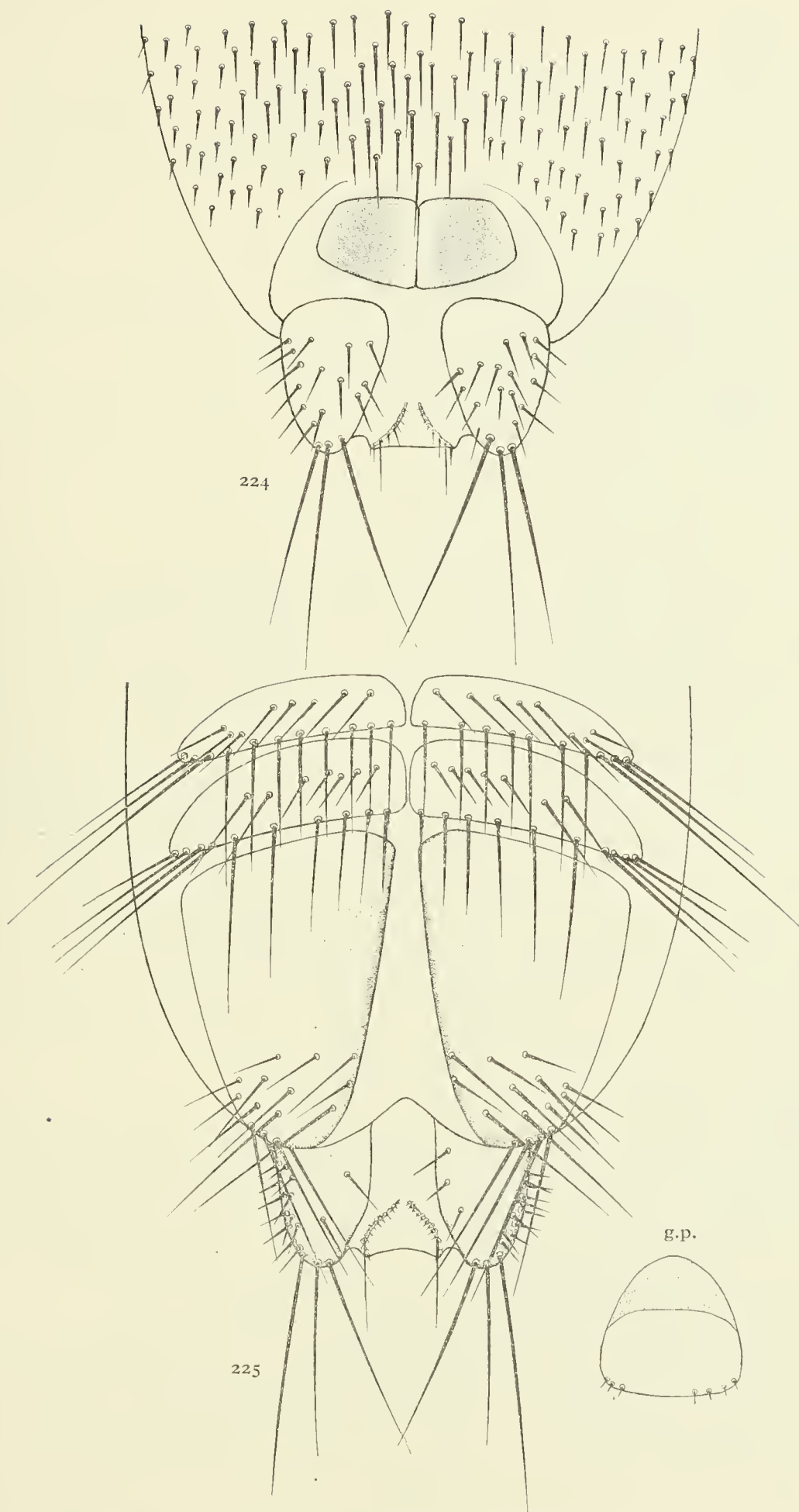
rounded tip. Parameres with curved and pointed apical process and a row of about 8–10 setae at the ventral edge which has a marked bulge.

*Female abdomen.* Tergite 1 with concave posterior margin and a marginal row of moderately long setae with a gap in the middle. Tergite 2 large, rounded, with a marginal row of longer and



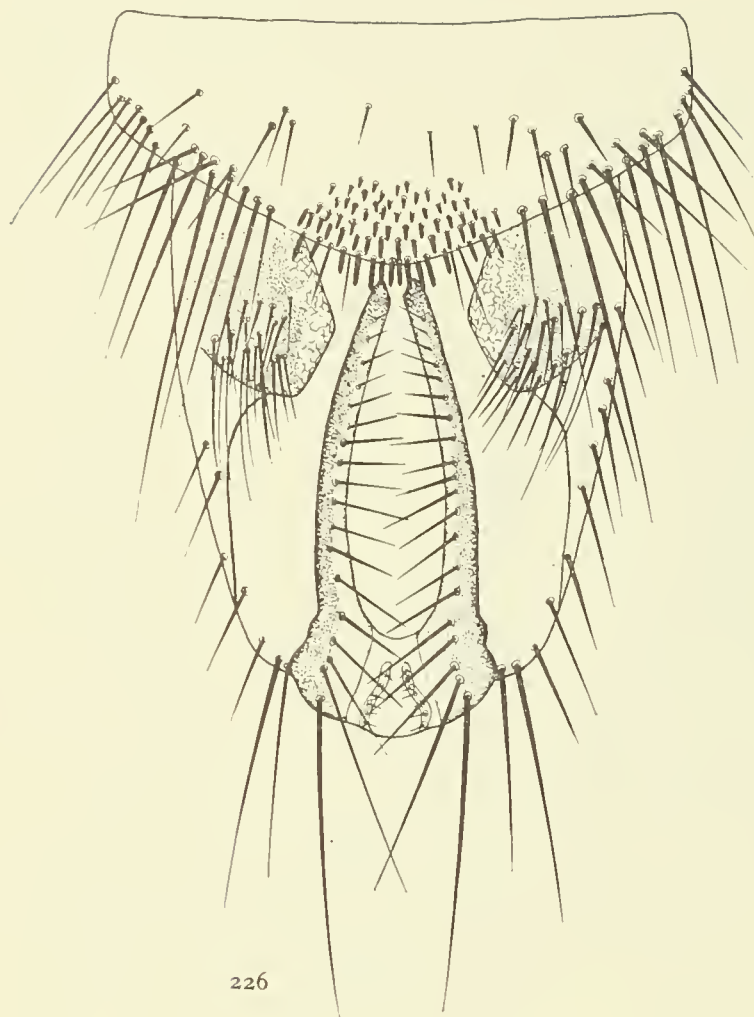
Figs. 222, 223. *Stylidia hindlei* (Scott). Male. 222. sternite 5 and genital area; 223. genitalia.

shorter setae and several rows of short hairs along the median division line. Tergite 6 elliptical, or triangular, with about 6 setae posteriorly and a few short setae on the surface. Connexivum between tergites 2 and 6 bare. Anal segment short, conical, with 3–4 long setae at the anal processes and short setae on the dorsal and lateral surface. Sternites 5 and 6 divided into narrow

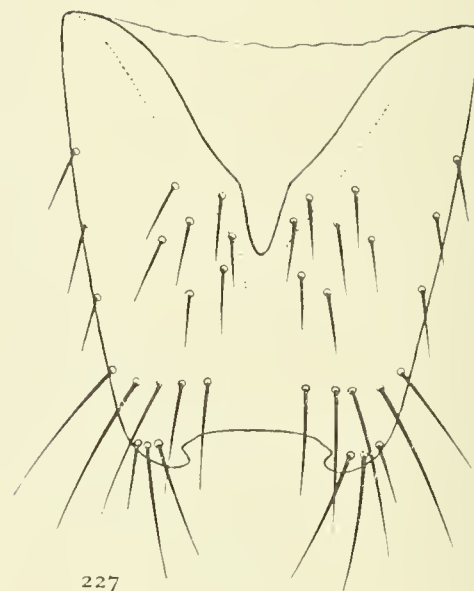


Figs. 224, 225. *Stylidia incisa* n.sp. Female. 224. posterior part of abdomen, dorsal; 225. same, ventral, with genital plate.

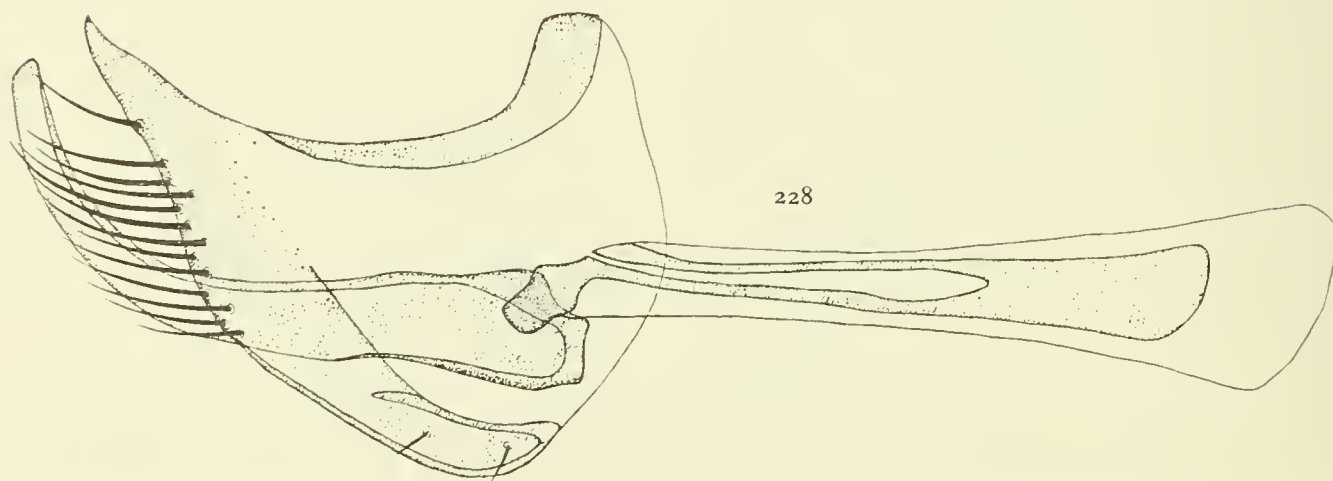




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227



228

Figs. 226-228. *Stylidia incisa* n.sp. Male. 226. sternite 5 and genital area; 227. anal segment, dorsal (dotted line indicates deeper incision in another specimen); 228. genitalia.

lateral sclerites which reach to the midline. Sternite 7 also divided into rectangular lateral sclerites. Genital plate broadly rounded posteriorly, wider than long, without hairs.

Specimens from Japan are larger and differ in minor details. They may eventually prove a distinct subspecies.

## MATERIAL IN THE COLLECTION

## CHINA

Tsinan, Shantung, from *Rhinolophus ferrumequinum nippon*, 2.vii. 1926, E. Hindle, ♂ holotype, 1 ♂ 2 ♀ paratypes (Brit. Mus. 1936.99).

Tsinan, from *Rhinolophus ferrumequinum nippon*, 9.x. 1925, E. Hindle, 1 ♂ 2 ♀ paratypes.

## OTHER MATERIAL EXAMINED

## JAPAN

Miyagi, Sawada, Honshu, from *Rhinolophus ferrumequinum nippon*, 13.v. 1952, A. J. Nicholson, 1 ♂ 2 ♀, Chicago Natural History Museum.

**Stylidia incisa** n.sp.

(Figs. 224-228)

This species is closely related to *S. maxima* and one of these two species may eventually prove to be a subspecies of the other.

Length 4 mm. Head and thorax as in *S. maxima* n.sp.

*Male abdomen.* Narrower than in *S. maxima*. Anal segment conical, not as broadly rounded as in *S. maxima*, with a deep angular incision of the anterior dorsal margin which reaches to the posterior third of the segment. The spines on sternite 5 stand in 6-7 rows; the anterior spines are very short and the whole group is less wide than in *S. maxima*. The basal corners of the anal segment are produced into lobes with setae. The claspers are very slender, darkly pigmented and curved. The apical process of the parameres is longer than in *S. maxima* and the row of setae at the ventral edge is double and consists of about 15 setae.

*Female abdomen.* As in *S. maxima*, but the two small sclerites of tergite 6 are without setae and adjoin each other, while they are separated in *S. maxima*. The lateral sclerites of sternite 7 are much larger and longer than wide. The genital plate is triangular with rounded apex, 0.37 mm. wide, 0.34 mm. long.

## MATERIAL IN THE COLLECTION

## INDIA

Gopaldhara, near Darjeeling, from *Hipposideros armiger*, 3.ix. 1919, ♂ holotype, 1 ♂ paratype, H. Stevens, N. C. Rothschild.

## OTHER MATERIAL EXAMINED

## BURMA

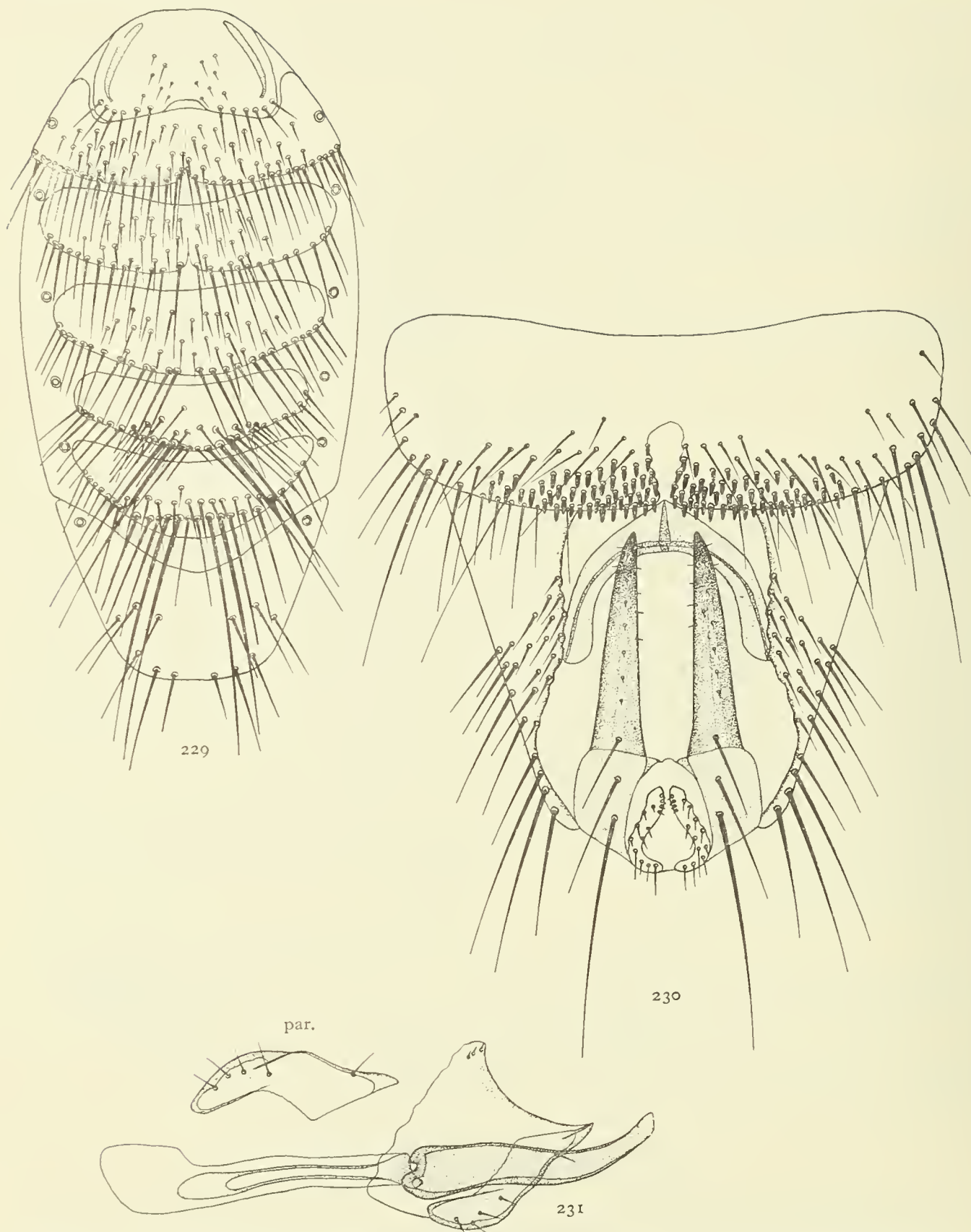
'Alto Birma', from *Hipposideros armiger*, 1 ♂ 1 ♀. No other data.

**Stylidia inopinata** (Theodor, 1957)

(Figs. 229-231)

*Nycteribia inopinata.* Theodor, 1957, *Parasitology*, 47, 457.

*Head.* About 6 setae at the anterior dorsal margin. Labella of the proboscis as long as the theca.



Figs. 229-231. *Stylidia inopinata* (Theodor). Male. 229. abdomen, dorsal; 230. sternite 5 and genital area; 231. genitalia.



*Thorax.* As long as wide. 9 notopleural setae. 3 setae at the posterior margin of the sternal plate at each side, the middle seta of each group as long as sternite 1 + 2. Tibiae about 5 times as long as wide. Femur 3 slightly shorter than thorax and sternite 1 + 2 together.

*Male abdomen.* Tergite 1 with a row of 10 strong, short setae with a gap in the middle. Tergites 2 and 3 with marginal rows of moderately long setae; surface covered with short hairs in the middle. Both tergites are incompletely divided in the middle, tergites 4-6 undivided. 4 long setae in the middle of the marginal rows of tergites 5 and 6. Tergite 4 with short hairs in the middle of the surface, tergites 5 and 6 bare. Anal segment wide and rounded, with deeply concave anterior dorsal margin and a double transverse row of short setae dorsally. Abdominal ctenidium with 47 spines. Sternite 5 longer than sternite 4, with a deep median incision of the posterior margin which is widening anteriorly. Two groups of short spines in 4-5 rows near the indentation, all of about equal length.

*Genitalia.* Claspers tapering uniformly, with dark tip. 3 long setae dorsally near the base. Basal arc wide, rounded, with a short anterior process. Aedeagus wide in dorsal view, curved in side view. Parameres with short apical process.

Female unknown.

CAMEROONS. Nkoétyé near Ebolowa, from *Rhinolophus alcyone*, U. Rahm, ♂ holotype. Muséum d'Histoire Naturelle, Geneva.

### *Stylidia integra* (Theodor & Moscona, 1954)

(Figs. 232-238)

*Nycteribia blainvillii* Leach. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia blainvillii* Leach. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Nycteribia integra*. Theodor & Moscona, 1954, *Parasitology*, **44**, 157 (nom. nov.).

*Nycteribia integra* Theodor & Moscona. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 25.

*Nycteribia integra* Theodor & Moscona. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.5 mm. Colour yellowish brown. Head, thorax and legs as in *S. biarticulata*.

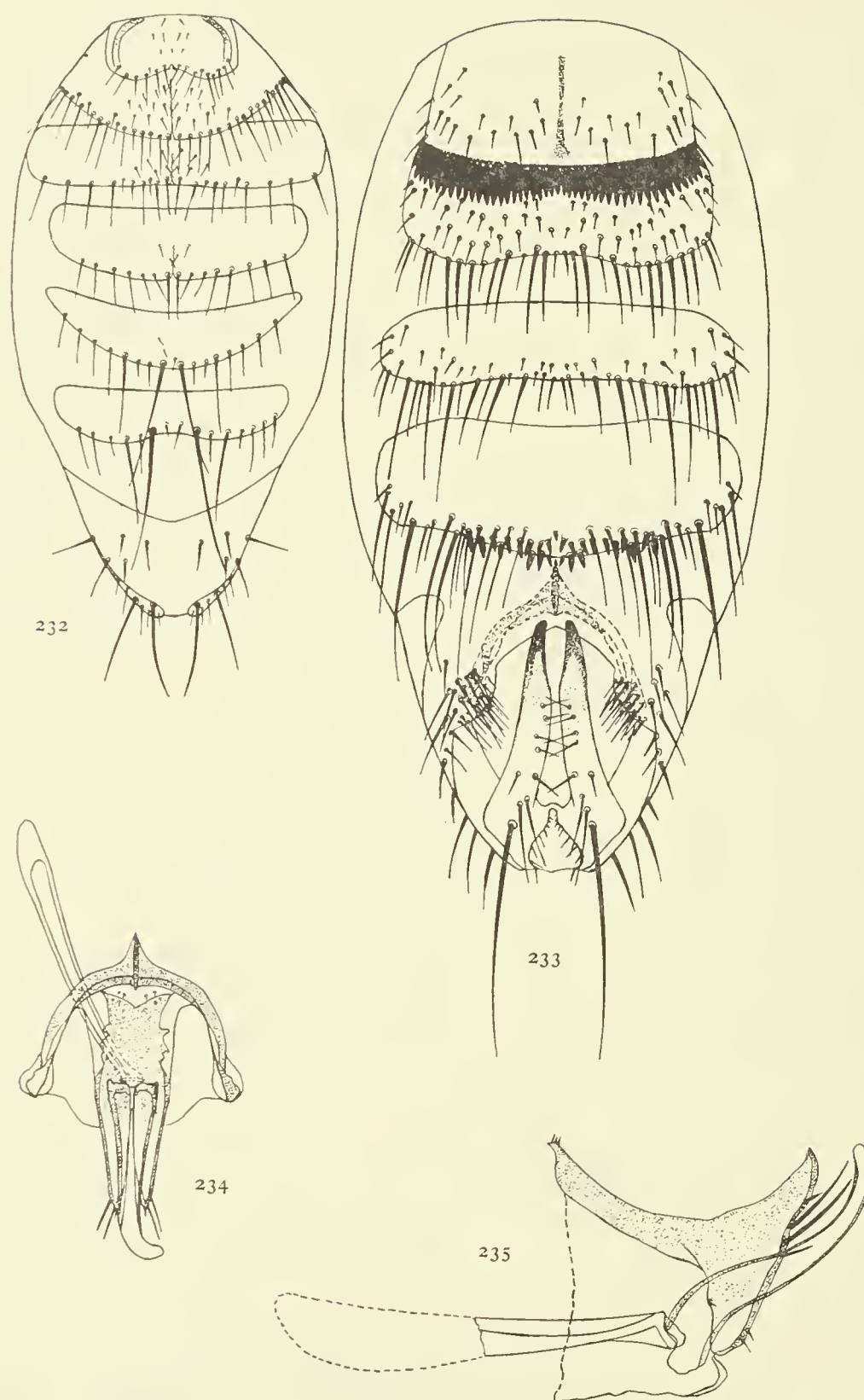
*Male abdomen.* Tergites undivided, marginal rows consisting of moderately long setae in the middle of the marginal rows of tergites 5 and 6. About 10 short hairs on the surface of tergite 3 and a few on tergites 4 and 5. Sternite 5 with straight or slightly convex posterior margin which bears a double row of about 25 short spines.

*Genitalia.* Aedeagus curved, tapering to a blunt point. Parameres fused with the phallobase, with a long, curved, pointed apical process and 3-5 setae in the middle of the ventral edge.

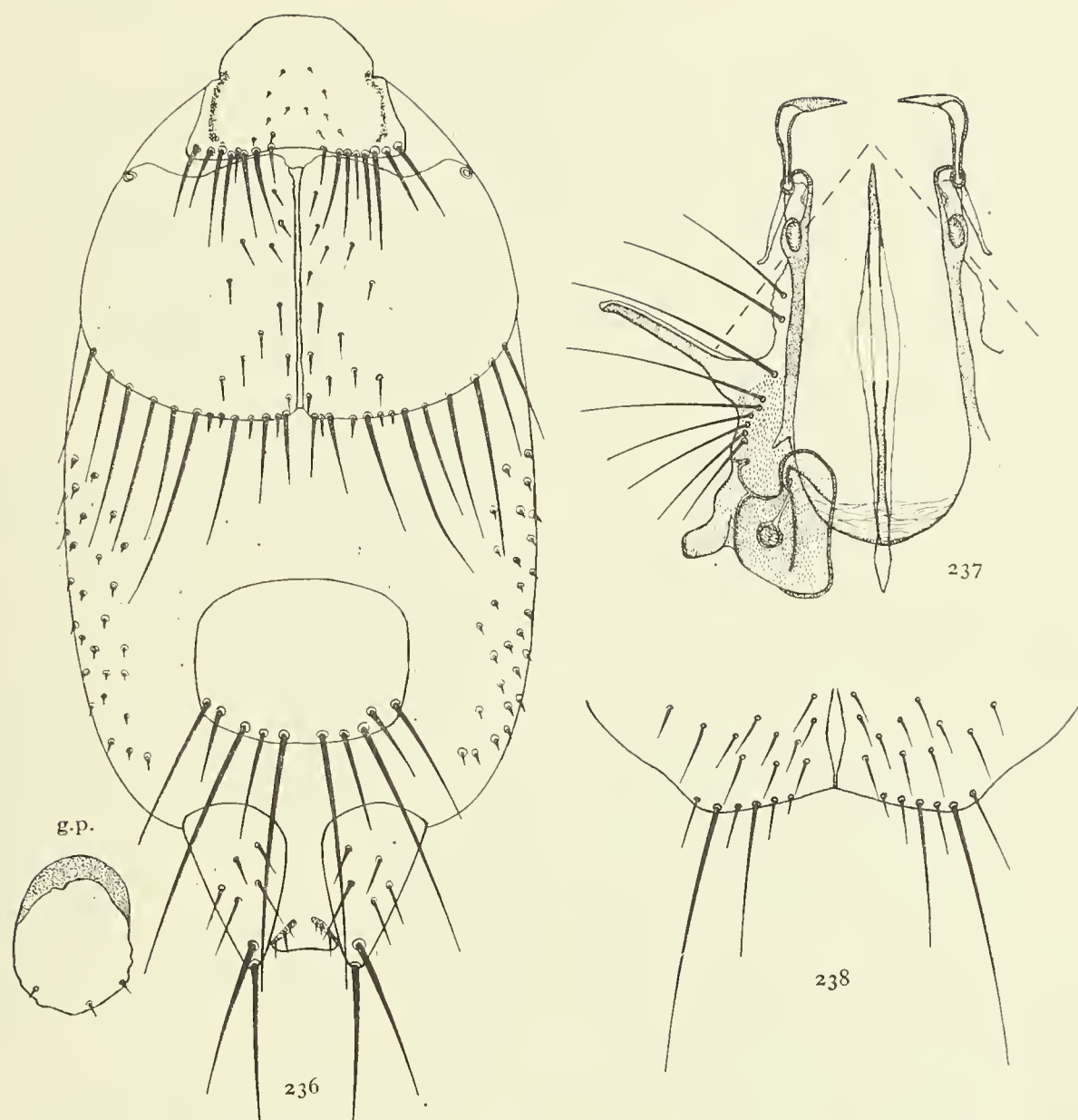
*Female abdomen.* Tergites 1, 2 and 6 with long setae posteriorly. Tergite 2 large, rounded, with a double row of short setae near the midline. Marginal row consisting of about 18 setae which are shorter in the middle. Connexivum between tergites 2 and 6 bare. Tergite 6 large, roughly rectangular, bare on the surface, with 4-6 long setae and some shorter ones at the posterior margin. Anal segment rather long, conical. Sternite 1 + 2 with a ctenidium of 50-55 spines. Dorsal genital plate shield-shaped, rounded anteriorly with a few minute hairs at the base.

Distribution: Arabia, Egypt, Israel.

Type series in the Dept. of Parasitology, Hebrew University, Jerusalem.



Figs. 232-235. *Stylidia integra* (Theodor & Moscona). Male. 232. abdomen, dorsal; 233. same, ventral; 234. genitalia, dorsal; 235. same, profile.



Figs. 236-238. *Stylidia integra* (Theodor & Moscona). 236. female abdomen, dorsal, and genital plate; 237. dorsal pattern of thorax; 238. posterior margin of sternal plate of thorax.

MATERIAL IN THE COLLECTION

ARABIA

Al Asr, Sana's, Yemen, from *Rhinolophus blasii*,  
17.ii. 1951, H. Hoogstraal, 1 ♂.

EGYPT

Abu Rawash, Gizah, from *Rhinolophus acrotis*  
*brachygnathus*, 14.v. 1951, H. Hoogstraal, 1 ♂ 1 ♀.

HOST SYNONYMY

Name on the original label  
*Rhinolophus clivosus brachygnathus* Andersen.

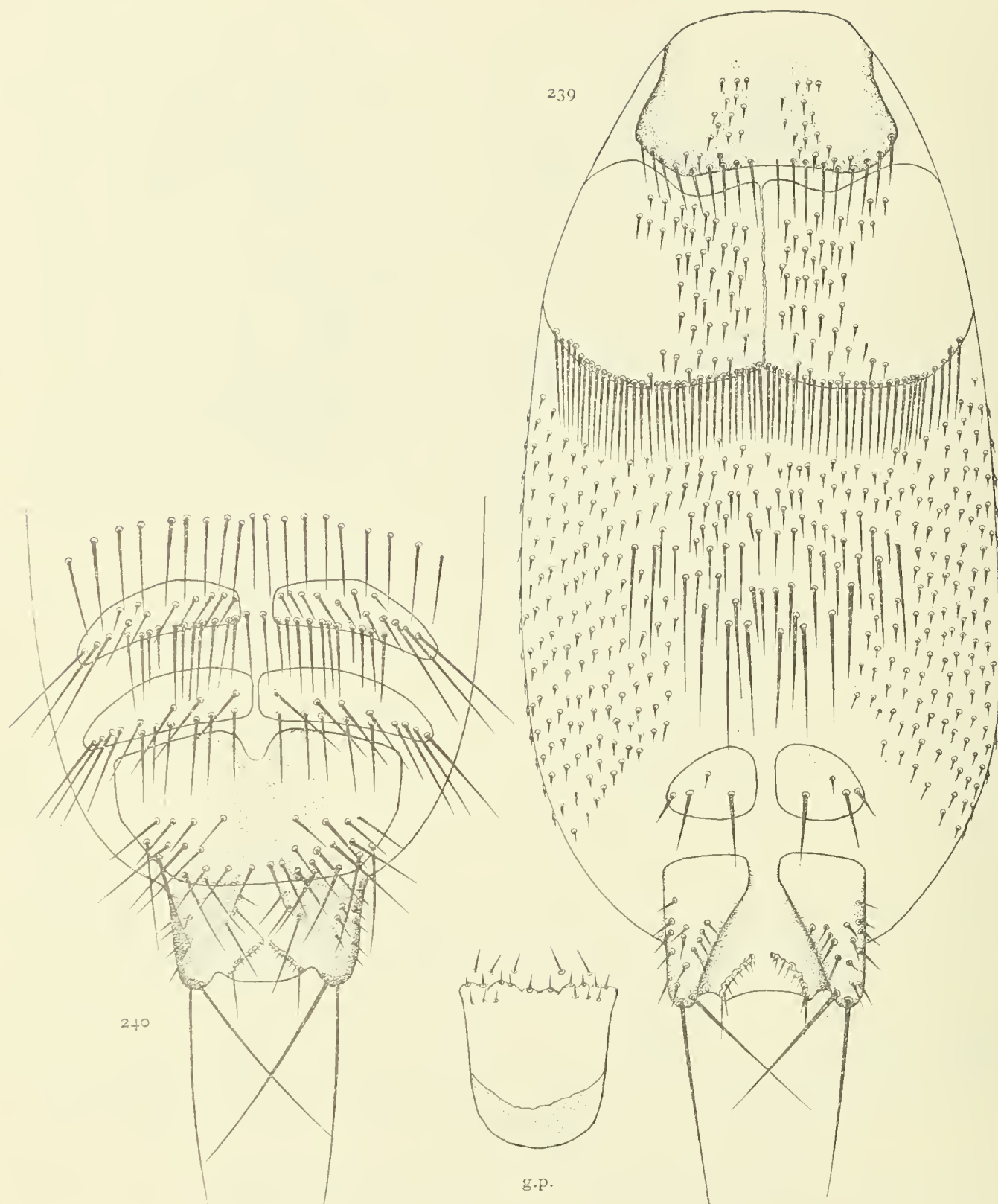
Current name  
*R. acrotis brachygnathus* Andersen.

***Stylidia maxima* n.sp.**

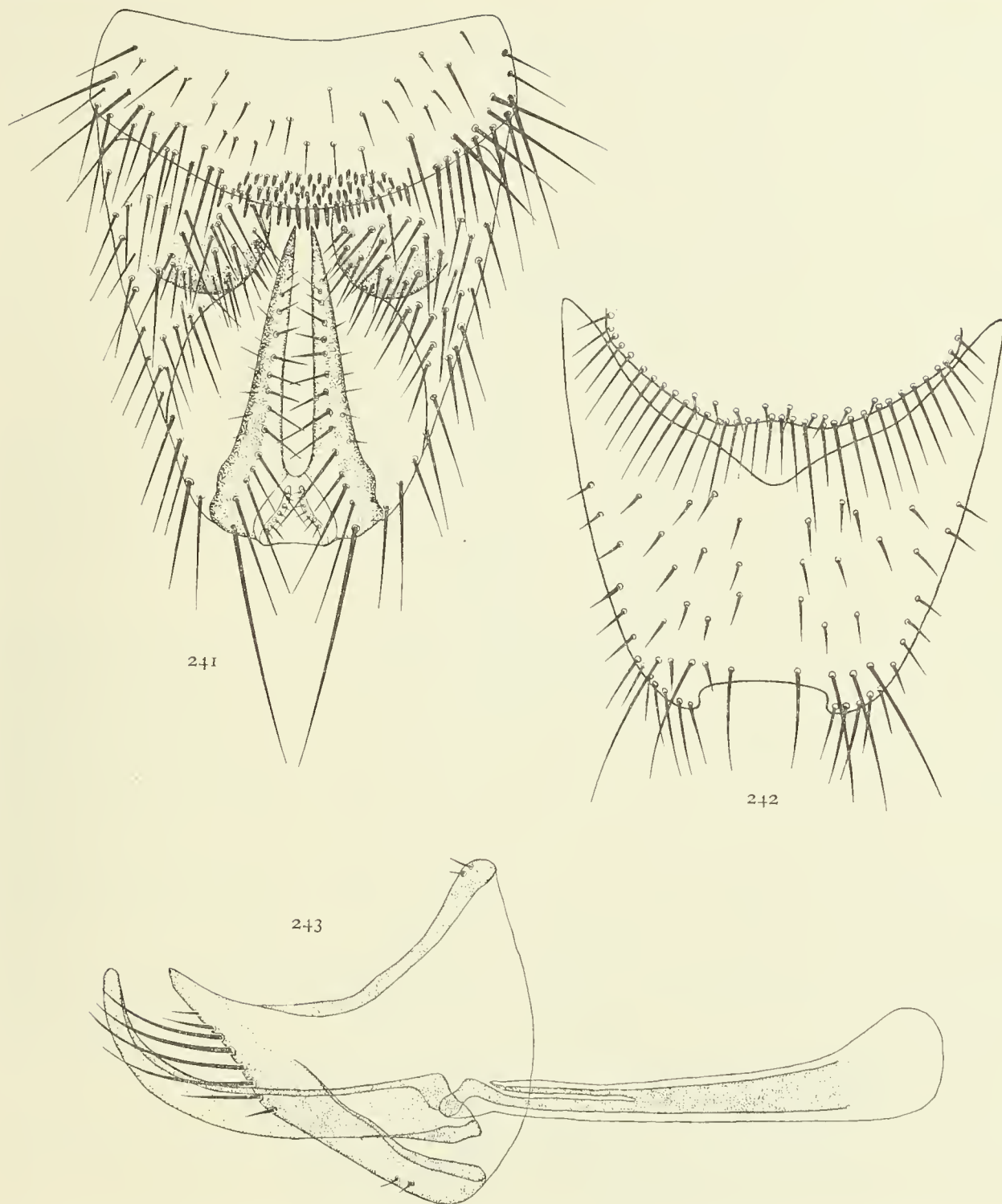
(Figs. 239-243)

Length 3.75-4 mm. Colour brown. Head with 4-6 setae at the anterior dorsal margin.





Figs. 239, 240. *Stylidia maxima* n.sp. Female. 239. abdomen, dorsal; 240. same, ventral, posterior part, with genital plate.



Figs. 241-243. *Stylidia maxima* n.sp. Male. 241. sternite 5 and genital area; 242. anal segment, dorsal; 243. genitalia.

*Thorax.* As long as wide. Oblique sutures forming an angle of  $90^\circ$ . Thoracic ctenidium with about 25 pointed, slender spines, 12-15 notopleural setae. The posterior setae stand close together and form a double row. The posterior margin of the sternal plate has 6-7 setae at each side, two of which are long. Tibiae 4 times as long as wide, with 4 rows of setae in the distal part of the ventral edge.

*Male abdomen.* Post-spiracular sclerite with 6–8 setae, becoming broader towards the spiracle. Tergite 1 with a double marginal row of short, thin setae. Tergite 2 incompletely divided, with a uniform marginal row of closely placed short setae. Tergites 3–6 with similar marginal rows, but some setae in the middle of the rows on tergites 5–6 are much longer. Surface of tergites 2–4 covered with short hairs in their greater part, tergites 5 and 6 bare, except for a few pre-marginal setae. Anal segment very broad, conical, rounded posteriorly, with a shallow concavity of the anterior dorsal margin. Sternite 1 + 2 with a ctenidium of 55 spines and 2–3 rows of short setae on the posterior part of the surface. Sternites 3 and 4 with marginal rows of long setae laterally and shorter setae in the middle. Sternite 5 longer than 3 and 4 together, with a convex posterior margin, with a group of about 60 spines in 4–5 rows in the middle and 1–2 rows laterally. The spines of the posterior row are markedly longer than those of the anterior rows. Anal segment with two lateral bulges at the base which bear a thick brush of setae.

*Genitalia.* Claspers long and slender, tapering to dark points. Their outer side is darkly pigmented. They bear a row of setae from the base to the tip, the setae becoming gradually shorter towards the tip. Basal arc broad, with a short anterior process. Phallobase concave dorsally. Aedeagus long, tapering to a rounded tip, curved upwards. Parameres with a sharp apical process and about 8 setae at the ventral edge.

*Female abdomen.* Tergite 1 with a marginal row of short setae with a gap in the middle. Tergite 2 large, rounded, divided in the middle, with a large group of short hairs on the surface, except for a narrow strip in the middle. Marginal row consisting of closely placed, moderately long setae of uniform length. Connexivum behind tergite 2 covered with short setae which become gradually longer in the middle. Only short or very short setae on the pleurae. Tergite 6 is reduced to two small, triangular sclerites, each with 1–2 longer and some shorter setae. These sclerites are separated by a space of about half their own width. Anal segment short, nearly square, with 3 long setae at the anal processes and short spines on the dorsal surface. Sternite 1 + 2 as in the male. Sternites 3 and 4 with uniform rows of thick setae posteriorly and similar setae on the surface. Two long vertical setae laterally on sternite 3. Sternites 5 and 6 with lateral elliptical sclerites with moderately long, thick setae posteriorly and a row of short vertical setae on the surface. 3 long vertical setae at the lateral corners of the sclerites. Sternite 7 rectangular, more heavily sclerotized laterally, but not divided in the middle. 3–4 long setae posteriorly and several short vertical setae on the surface. Genital plate shield-shaped, large, rounded, with 2–3 rows of short spines near the base, 0.29 mm. long, 0.27 mm. wide.

THAILAND. Kana Chanaburi, Trakhanum, Hinlaem, from bats, 2.xi.1952, R. E. Elbel, ♂ holotype and ♀ paratype, Chicago Natural History Museum.

### ***Stylidia mindanaensis* (Theodor, 1963)**

(Figs. 192, 244, 245)

*Nycteribia (Stylidia) mindanaensis.* Theodor, 1963, *Fieldiana, Zoology*, **42**, 151.

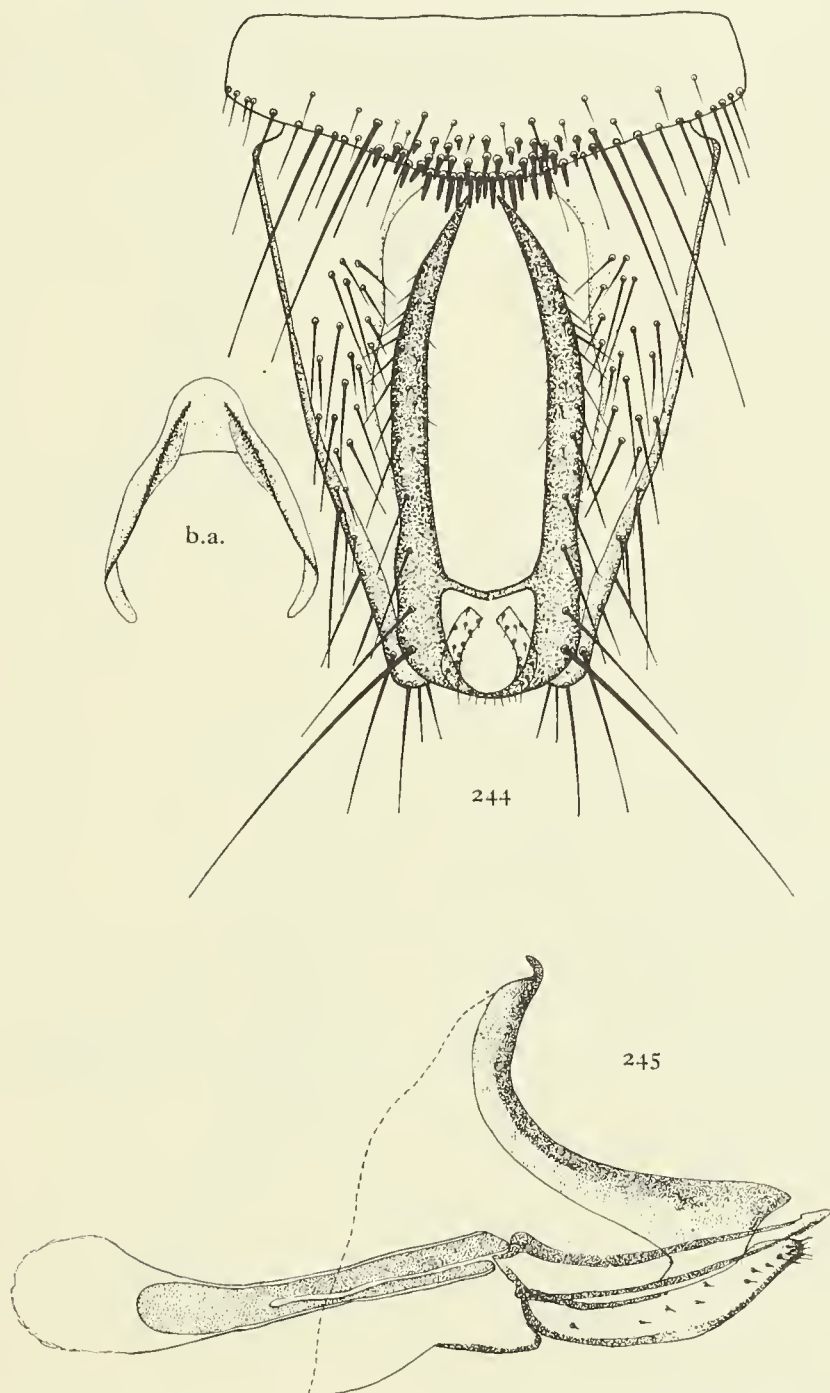
Length 2.5 mm. Colour brown. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax.* Slightly longer than wide. 11 notopleural setae. Lateral plate of the notopleural



sutures broad. Oblique sutures forming an angle of  $70^{\circ}$ . Posterior margin of the sternal plate with 3 setae at each side, the middle one of each group longer. Tibiae slender, with pointed ends, 5-5.5 times as long as wide.

*Male abdomen.* Tergite 1 with a row of moderately long setae posteriorly. Tergite 2 with



**Figs. 244, 245.** *Stylidia mindanaensis* (Theodor). Male. 244. sternite 5 and genital area, with basal arc; 245. genitalia.

longer and shorter setae in the marginal row and short hairs in the middle of the surface. Tergite 3 similar, but less hairs on the surface. Tergite 4 similar, but marginal setae more widely spaced. Tergite 5 with convex posterior margin and 2 long setae in the middle of the marginal row. Tergite 6 with more strongly convex posterior margin and a similar marginal row. Surface of

tergites 5 and 6 bare, except for 2-3 short setae. Anal segment very long, conical, with 4 setae on the dorsal surface and 6 setae at the posterior margin. Abdominal ctenidium with 42 spines. Sternite 5 slightly convex posteriorly. A triangular group of about 40 spines in 3 rows at the posterior margin. The spines of the posterior row are long or very long and those of the anterior row very short.

*Genitalia.* Claspers very long, pigmented, curved, tapering to a long point. Basal arc triangular. Phallobase strongly concave dorsally. Aedeagus conical, straight, with a short dorsal tooth near the tip. Apodeme long, with a broad end plate. Parameres slender, curved, with a dense group of short hairs at the rounded tip and a row of similar hairs along the sides.

Female unknown.

PHILIPPINES. Sitio Tegato, Davao, Mindanao, 22.x.1946, in cave, ♂ holotype, H. Hoogstraal. Chicago Natural History Museum.

### ***Stylidia nuditerga* n.sp.**

(Figs. 246-248)

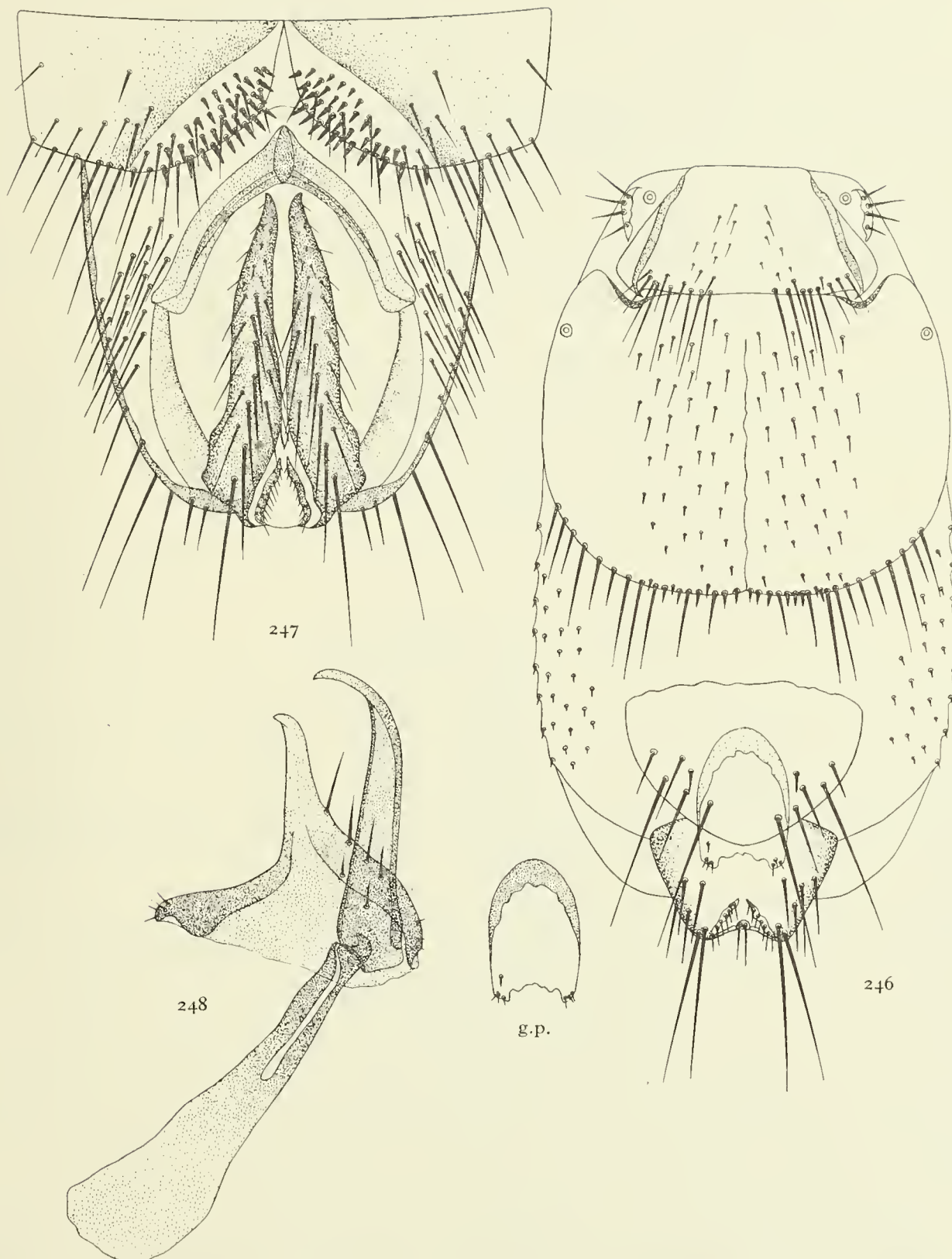
Length 3 mm. Colour brown. Head with 4 setae at the anterior dorsal margin.

*Thorax.* As long as wide. About 12 notopleural setae. Posterior margin of the sternal plate with 5 setae at each side. Tibiae with long tapering ends, 5 times as long as wide.

*Male abdomen.* Post-spiracular sclerite with 6 setae. Tergite 1 with a marginal row of short setae. Tergites 2 and 3 incompletely divided in the middle. Tergites 2-4 with marginal rows of longer setae, on tergites 3 and 4 mixed with short spines. Tergites 2-4 with short hairs on the surface, tergites 5 and 6 bare. Two long setae in the marginal rows of tergites 5 and 6. The setae on these tergites are more widely spaced and their hind margin is strongly convex. Anal segment short, rounded, with some short setae on the dorsal surface. Abdominal ctenidium with about 55 spines and 3-4 rows of short hairs on the surface. Sternites 3 and 4 with marginal rows of moderately long setae which are longer laterally. 4 long premarginal vertical setae on sternite 4. Sternite 5 longer, with a median, less strongly sclerotized triangle and a deep incision of the posterior margin. Two groups of about 35 short spines in 4 rows along the sides of the incision, those of the posterior row longer. A group of long, vertical setae anterior to the lateral spines and some horizontal setae laterally.

*Genitalia.* Basal arc broad, triangular. Claspers thick, straight, tapering to dark points. A long seta dorsally near the base and several rows of shorter setae up to the middle. Phallobase short, deeply concave dorsally. Aedeagus conical, curved upwards to a rounded tip. Parameres with a very long curved apical process, fused with the phallobase. 3-4 long hairs near the base of the apical process and a few short hairs at the base of the paramere.

*Female abdomen.* Tergite 1 as in the male, but the median gap in the marginal row is wider. Tergite 2 very large, divided in the middle, with a marginal row of moderately long and short setae laterally, and only short spines in the middle. 3 or 4 rows of short spines along the median division line. Connexivum between tergites 2 and 6 bare. A few short spines on the pleurae. Tergite 6 large, roughly triangular or rounded posteriorly with a row of 4 long and some short setae posteriorly and a few spines on the surface. Anal segment short, conical, with 2 long



Figs. 246-248. *Stylidia nuditerga* n.sp. 246. female abdomen, dorsal, and genital plate; 247. male sternite 5 and genital area; 248. male genitalia.



setae posteriorly and several shorter setae on the dorsal surface. Sternites 3 and 4 membranous, with uniform marginal rows of moderately long setae and short setae on the surface and some vertical ones laterally. Sternites 5 and 6 with narrow curved lateral sclerites with horizontal marginal rows and 3 vertical longer setae laterally. Sternite 7 longer, trapezoidal, divided into lateral sclerites with 2 long horizontal setae at the posterior margin and a premarginal row of long vertical setae. Several short setae further anteriorly. Genital plate very large, shield-shaped, with a more heavily sclerotized apical rim and an irregular basal margin with 2 groups of 3-5 minute hairs at the corners.

This species resembles *S. biloba* closely, particularly the male, but differs in the shape of the tergites both in the male and the female, as well as in a number of other details.

## MATERIAL IN THE COLLECTION

## INDIA

Koli State, N.W. Himalayas, from *Barbastella leucomelas darjelingensis*, 11.viii.1912, P. J. Dodsworth, N. C. Rothschild, ♂ holotype, 2 ♂ 3 ♀ paratypes.

## HOST SYNONYMY

<i>Name on original label</i>	<i>Current name</i>
<i>Barbastella darjelingensis</i> Hodgson.	<i>B. leucomelas darjelingensis</i> Hodgson.

**Stylidia ornata** (Theodor, 1954)

(Figs. 249-252)

*Nycteribia ornata*. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 27.

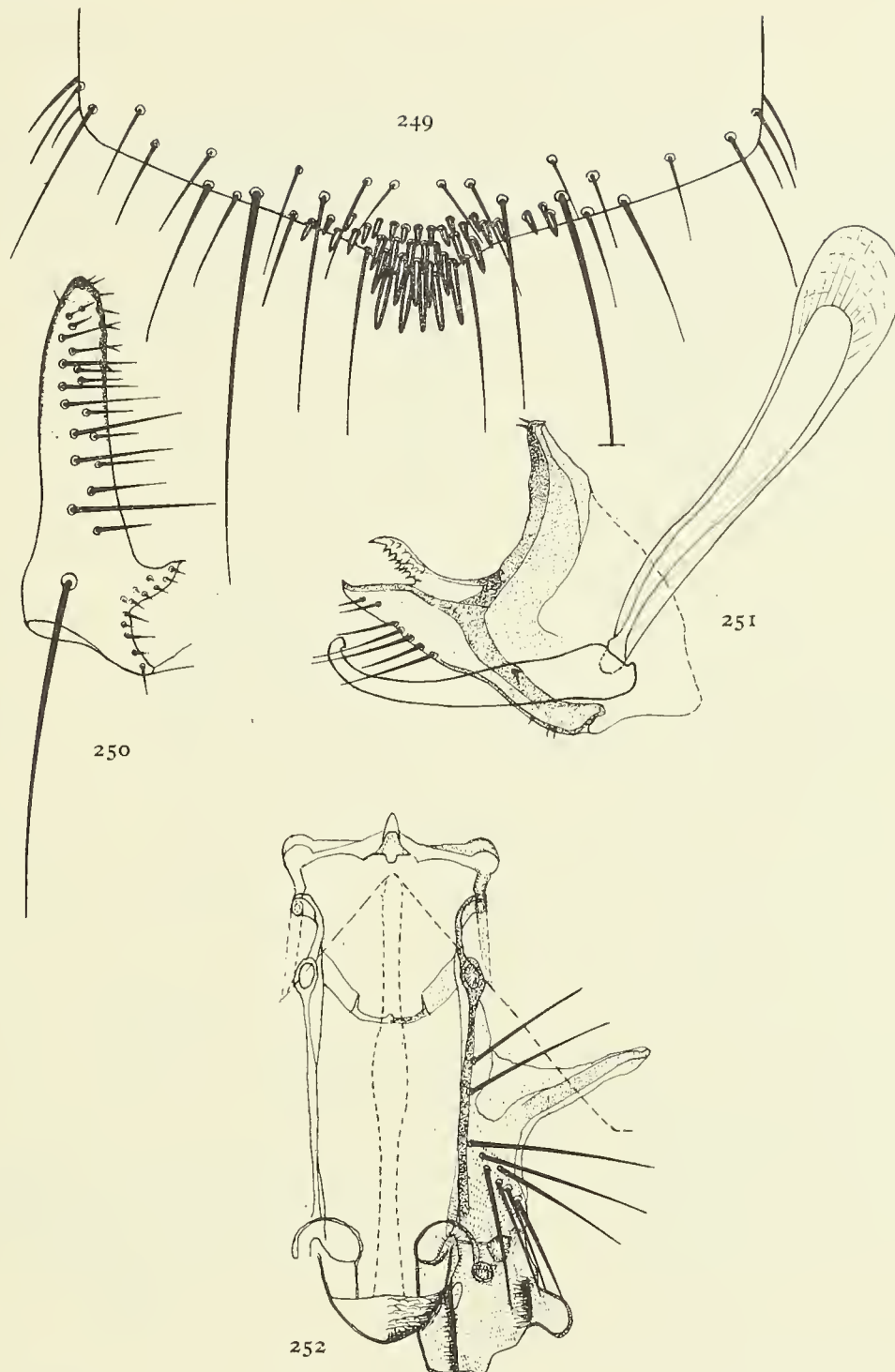
Length 2 mm. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis slightly shorter than the theca.

*Thorax*. As long as wide. Mesonotum very narrow. 9-12 notopleural setae. Oblique sutures forming an angle of about 75°. Tibiae markedly shorter than the femora, 4 times as long as wide.

*Male abdomen*. Tergite 1 with a marginal row of moderately long setae. Tergites 2-5 with marginal rows of moderately long setae which are more widely spaced on tergites 4 and 5. Two setae in the marginal row of tergite 6 very long. Tergites 2-4 with short hairs on the surface, only a few on tergite 5. Anal segment short, rounded. Sternite 1 + 2 with a ctenidium of 42 spines. Sternite 5 with a convex posterior margin with a median process which bears a group of spines in 4-5 rows; those of the posterior row are 4-6 in number and about 5 times as long as those of the anterior row; the anterior two rows extend much further laterally than the posterior ones.

*Genitalia*. Anal segment with 2 movable processes at the basal corners similar to those of *S. biarticulata*, but smaller. Basal arc rounded, with a short posterior process. Claspers short, thick, slightly curved, with blunt ends. Phallobase with a long process distally which is serrated at its concave ventral side. Parameres with triangular apex and about 8 setae at the ventral edge, fused with the phallobase. Aedeagus tapering, nearly straight, with upturned, rounded tip.

Female unknown.



Figs. 249-252. *Stylidia ornata* (Theodor). Male. 249. sternite 5; 250. clasper; 251. genitalia; 252. dorsal pattern of thorax.

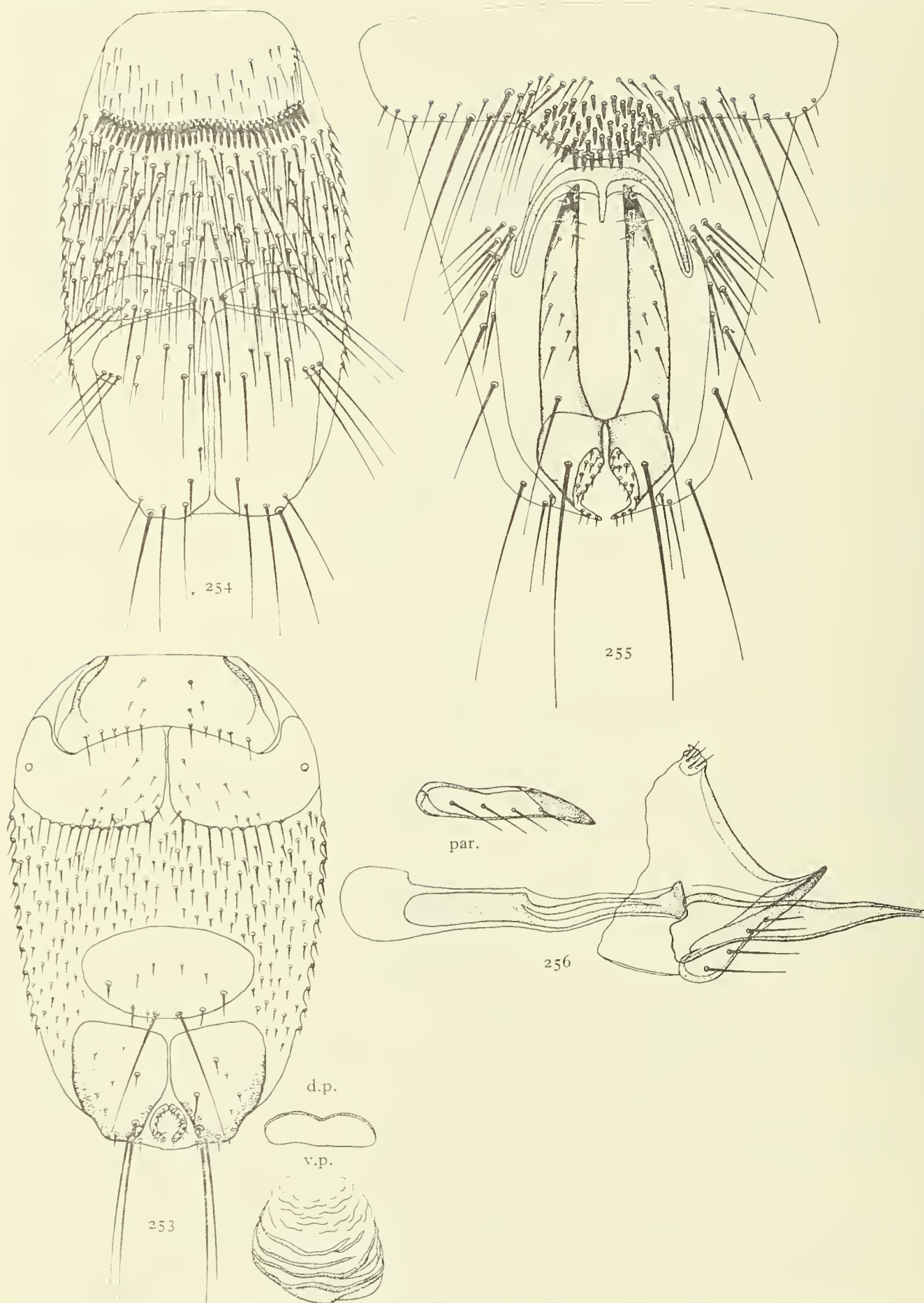
CHINA. Nguluko, Yunnan, from bat no. 154, 27.ii.1929, ♂ holotype, 1 ♂ paratype, Kelley Roosevelt Expedition. Chicago Natural History Museum.

***Stylidia ovalis* (Theodor, 1957)**

(Figs. 253-256)

*Nycteribia ovalis*. Theodor, 1957, *Parasitology*, 47, 457.

Length 2 mm. 6-8 setae at the anterior dorsal margin of the head.



Figs. 253-256. *Stylidia ovalis* (Theodor). 253. female abdomen, dorsal, with dorsal and ventral genital plates; 254. same, ventral; 255. male sternite 5 and genital area; 256. male genitalia.



*Thorax.* Slightly longer than wide. Angle of the oblique sutures about  $75^{\circ}$ . 8–10 notopleural setae. Posterior row of the sternal plate with 3 setae at each side.

*Male abdomen.* Tergite 2 incompletely divided, with a marginal row of moderately long setae. Tergites 3–6 with widely spaced short setae in the marginal rows. Only 2 setae in the marginal rows of tergites 5 and 6 are longer. A few short setae on the surface of tergites 3 and 4. Tergites 5 and 6 bare. Anal segment conical, with 3–4 long setae posteriorly and a transverse row of short setae on the dorsal surface. Sternite 1 + 2 with a ctenidium of 36 rather short spines. Sternite 5 with a broad bulge in the middle of the posterior margin which bears an elliptical group of about 45 short spines in 5–6 rows. The posterior spines only slightly longer than the anterior ones.

*Genitalia.* Basal arc large, rounded, with a short posterior process. Claspers slightly curved, phallobase conical, with 2 groups of short hairs near the base. Aedeagus straight, tapering to a point. Apodeme with a narrow end plate. Parameres long, partly fused with the phallobase, with a long, pointed distal process and 4–5 rather long setae basally.

*Female abdomen.* Tergite 1 with a marginal row of about 10 short setae with a gap in the middle. Tergite 2 short, divided in the middle, with a marginal row of about 10 short setae and some short spines on the median part of the surface. Tergite 6 large, elliptical, with 2 long setae in the middle of the posterior margin and 2–3 short spines laterally and about 4 such spines on the surface. Connexivum between tergites 2 and 6 covered with long spines. Anal segment large, rounded, with 2 lateral sclerites which bear 2 long setae posteriorly and a few spines dorsally. Sternite 1 + 2 as in the male. Sternites 3 and 4 with marginal rows of short setae and their surface covered with setae which are not much shorter than those of the marginal rows. Sternite 5 with narrow, elliptical lateral sclerites with long and short setae posteriorly and shorter setae on the surface. Sternites 6 and 7 also divided into lateral sclerites; the sclerites of each side of both sternites are fused into an oblong plate. The arrangement of setae on the part of the plate corresponding to sternite 6 is similar to that on sternite 5. The sclerites of sternite 7 are bare, except for 4 long setae posteriorly and a few spines along the median division line. Dorsal genital plate unarmed, rectangular, forming a lip which covers the genital opening from above. Ventral plate large, concave on the posterior surface and with transverse ridges.

Distribution: Sierra Leone, Mozambique, Tanganyika, South Africa.

Type series in the Department of Parasitology, Hebrew University, Jerusalem.

#### MATERIAL IN THE COLLECTION

##### SOUTH AFRICA

Transvaal, from *Rhinolophus blasii empusa*, 22.vi. 1958, Arnold, 1 ♂ 1 ♀.

#### *Stylidia phillipsi* (Scott, 1925)

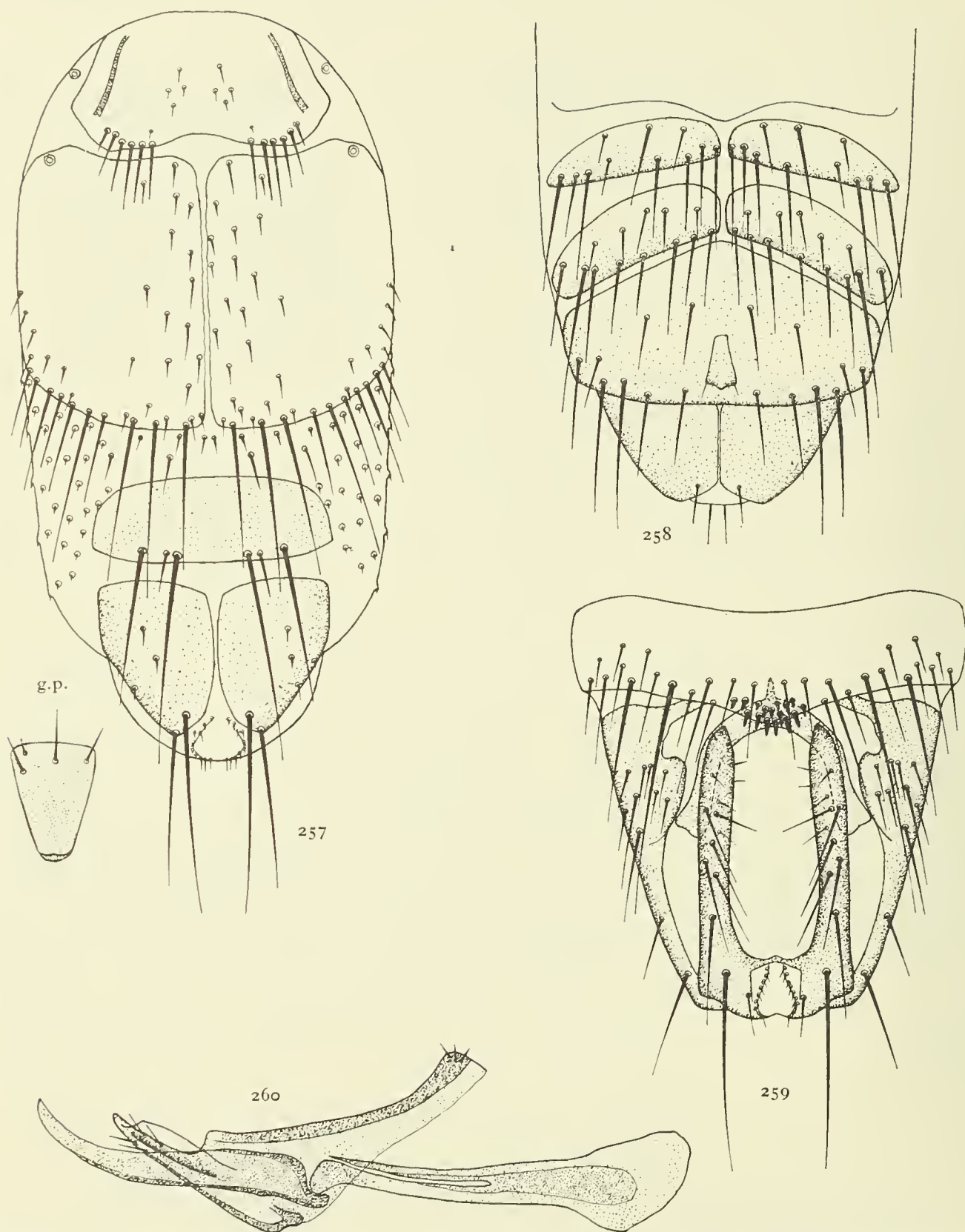
(Figs. 257–260)

*Nycteribia (Acrocholidia) phillipsi*. Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (description of female).

*Nycteribia (Acrocholidia) phillipsi* Scott. Scott, 1936, *Jour. Linn. Soc. Zool.* **39**, 479 (description of male).

*Nycteribia phillipsi* Scott. Hiregaudard & Bal, 1956, *Agra Univ. Jour. Res. (Science)* **5**, 1.

Length 2.2–2.5 mm. Colour brown. Head with 4–6 setae at the anterior dorsal margin. Labella of the proboscis slightly longer than the theca.



Figs. 257-260. *Stylidia phillipsi* (Scott). 257. female abdomen, dorsal, and genital plate; 258. same, ventral, posterior part; 259. male sternite 5 and genital area; 260. male genitalia.

*Thorax.* Slightly longer than wide. Oblique sutures forming an angle of about  $80^{\circ}$ . 8–10 notopleural setae in Ceylon specimens, 10–12 in specimens from Bombay, the anterior setae more widely spaced. A large gap between seta 2 and 3. The posterior margin of the sternal plate has 3–4 setae at each side. Tibiae 4 times as long as wide.

*Male abdomen.* Post-spiracular sclerite wide, with 6 setae. Tergite 1 with a marginal row of 6–8 fine setae. Tergites 2–6 with marginal rows of longer and thicker setae. Tergite 2 is divided in the middle and has a number of short hairs on the surface. Tergites 3–6 undivided. A few short hairs on the surface of tergite 3, tergites 4–6 bare. Two long setae in the marginal row of tergite 5 and 4 such setae on tergite 6. Anal segment broadly conical with a deeply incised anterior margin and a few short spines dorsally and some longer setae posteriorly. Abdominal ctenidium with 40–50 spines and 1–2 rows of widely spaced setae on the surface. Sternites 3 and 4 with marginal rows of moderately long, thick setae and 1–2 rows of short hairs on the surface. Sternite 5 longer, with a bulge in the middle of the posterior margin which bears a dense group of 16–18 spines in the Ceylon specimens and only 8–12 in specimens from Bombay. Anal segment with a lateral bulge near the base on the ventral side which is covered with setae.

*Genitalia.* Basal arc broadly rounded, with a short anterior process. Claspers straight, with blunt ends. Phallobase slender, conical, with a pronounced dorsal hump, divided in the middle. Aedeagus slender, tapering to a blunt point, only slightly curved. Apodeme long, with a moderately wide end plate. Parameres with a long, curved apical process with a rounded end which bears a few short hairs near the tip both at the dorsal and the ventral edge. The sides of the parameres have a curved, plate-like expansion.

*Female abdomen.* Tergite 1 with a dense row of short, thick setae at the posterior margin with a gap in the middle. Tergite 2 very large, divided in the middle, with 2–3 rows of short spines near the midline. The posterior margin bears a uniform row of long, widely spaced setae alternating with short spines in the middle. The setae are longer and more widely spaced in the middle. The connexivum between tergites 2 and 6 with only 1–2 rows of short spines which are very short laterally. Tergite 6 transversely elliptical, with 2 long, 2 shorter setae and 2 spines at the posterior margin. Surface bare. There are a few short hairs on the surface of tergite 6 in the Bombay specimens. Anal segment short, with 2 long setae at the posterior processes. Sternite 1 + 2 as in the male. Sternites 3 and 4 with uniform marginal rows and shorter setae on the surface. Sternite 5 with curved lateral sclerites. The lateral sclerites of sternite 6 are larger and placed obliquely. The lateral sclerites of sternites 5 and 6 have horizontal setae posteriorly, short vertical setae on the surface and 2–3 long vertical setae laterally. Sternite 7 triangular, with a uniform row of vertical setae posteriorly and a transverse row of short vertical setae on the surface. Anal segment bare ventrally, except for 2 setae near the anal frame. There is a very small anal sclerite with 1–2 setae. Genital plate small, triangular, with rounded end and 4 short hairs near the base.

Distribution: India, Ceylon.

#### MATERIAL IN THE COLLECTION

##### CEYLON

Anasigalla, Matugama, Kalutara, from *Rhinolophus rouxi*, Dec. 1921, ♀ holotype, 1 ♀ paratype, W. W. A. Phillips.  
Gonagama, Kitulgala, from *Rhinolophus rouxi*, 31.xii. 1925, W. W. A. Phillips, 1 ♀.



Mousakande Estate, Gammaduwa, East Matale, from *Rhinolophus rouxi*, 29.iii. 1925, W. W. A. Phillips, 1 ♂ paratype.

Lunugalla, Uva, from bats, 10.vii. 1913, E. W. Major, N. C. Rothschild, 1 ♂.

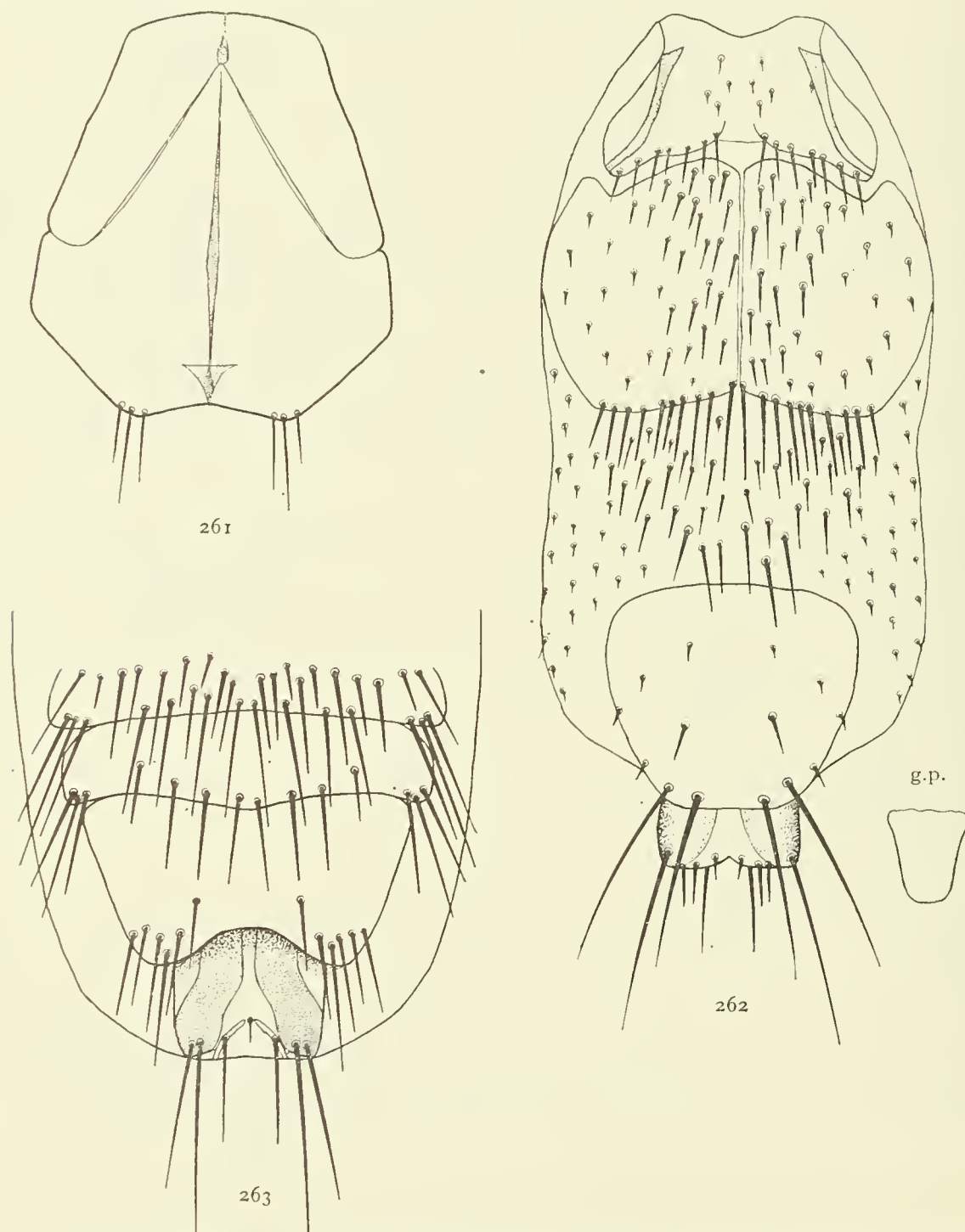
Tonacambe Estate, Namunukula, Uva Hills, from *Rhinolophus rouxi*, 25.xi. 1957, W. W. A. Phillips, 1 ♀.

***Stylidia phthisica* (Speiser, 1907)**

(Figs. 261-263)

*Nycteribia (Acrocholidia) phthisica*. Speiser, 1907, *Rec. Ind. Mus.* 1, 295.

*Nycteribia (Acrocholidia) phthisica* Speiser. Scott, 1925, *Rec. Ind. Mus.* 27, 351.



Figs. 261-263. *Stylidia phthisica* (Speiser). Female. 261. thorax, ventral; 262. abdomen, dorsal, with genital plate; 263. same, ventral, posterior part.

Length 2.2 mm. Colour light brown. Head broad, with 4 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax.* As long as wide. Angle of the oblique sutures about 75°. 3 setae at each side of the posterior margin of the sternal plate. 9 notopleural setae. Tibiae 5 times as long as wide.

*Female abdomen.* Post-spiracular sclerite with 3 setae. Tergite 1 triangular, with a marginal row of 6–7 short, widely spaced spines in each half. Tergite 2 large, divided in the middle, with a marginal row of thick setae which are longer and placed more closely in the middle. Surface covered with short spines which are longer near the midline. There are several rows of short setae on the connexivum between tergites 2 and 6 and a row of longer setae in front of tergite 6. Tergite 6 as long as wide, projecting posteriorly from the abdomen, with 4 long setae at the posterior margin and 2 short spines at the lateral borders and a few on the surface. Anal segment short, narrow, parallel-sided, with 1–2 long setae posteriorly and 2–3 short spines laterally. Abdominal ctenidium with 40 spines. 2–3 rows of spines on the surface of sternite 1 + 2. Sternite 3 with several rows of thick setae. Sternite 4 with a row of vertical setae. Sternite 5 with narrow, curved lateral sclerites with 5 setae at their posterior margin, a few short ones on the surface and 3 vertical setae laterally. Sternite 6 longer, undivided, with 5 setae at the posterior margin, 3 long vertical setae laterally and 4 short setae on the surface. Sternite 7 trapezoidal, with a concave posterior margin, undivided, with more heavily pigmented lateral areas, bare on the surface and with a group of 5–6 setae at the posterior processes. Anal segment with oblique lateral sclerites on the ventral side. 2 setae laterally at the anal frame and a minute anal sclerite with 2 setae. Genital plate small, triangular, with rounded tip and without any setae.

Male unknown.

Distribution and host: Amboina, from *Rhinolophus euryotis*.

♀ holotype in the Indian Museum, Calcutta.

#### MATERIAL IN THE COLLECTION

##### MOLUCCAS

Amboina, from *Rhinolophus euryotis*, 1 ♀ paratype, H. O. Forbes.

#### **Stylidia psiloteria** n.sp.

(Figs. 264–267)

Specimens in the collection of the Vienna Natural History Museum were labelled with this name by Speiser, but apparently not published. The material is badly preserved.

Length 2–2.2 mm. Colour yellowish, probably bleached.

*Thorax.* 8–9 notopleural setae. 3 setae at the posterior margin of the sternal plate at each side.

*Male abdomen.* Post-spiracular sclerite with 4–5 setae. Tergite 1 with a single marginal row of short setae. Tergites 2–6 with marginal rows of longer and shorter setae. Those on tergites 5 and 6 are longer in the middle. There are large groups of short hairs on the surface of tergites 2 and 3, a few hairs on tergite 4, tergites 5 and 6 bare. Tergite 6 strongly convex posteriorly. Anal segment short, rounded posteriorly, with a concave anterior dorsal margin. Sternite 1 + 2 with a ctenidium of 30–32 spines and 2–3 rows of short setae on the surface. Sternites 3 and 4 with marginal rows of moderately long setae. Two very long vertical premarginal setae on

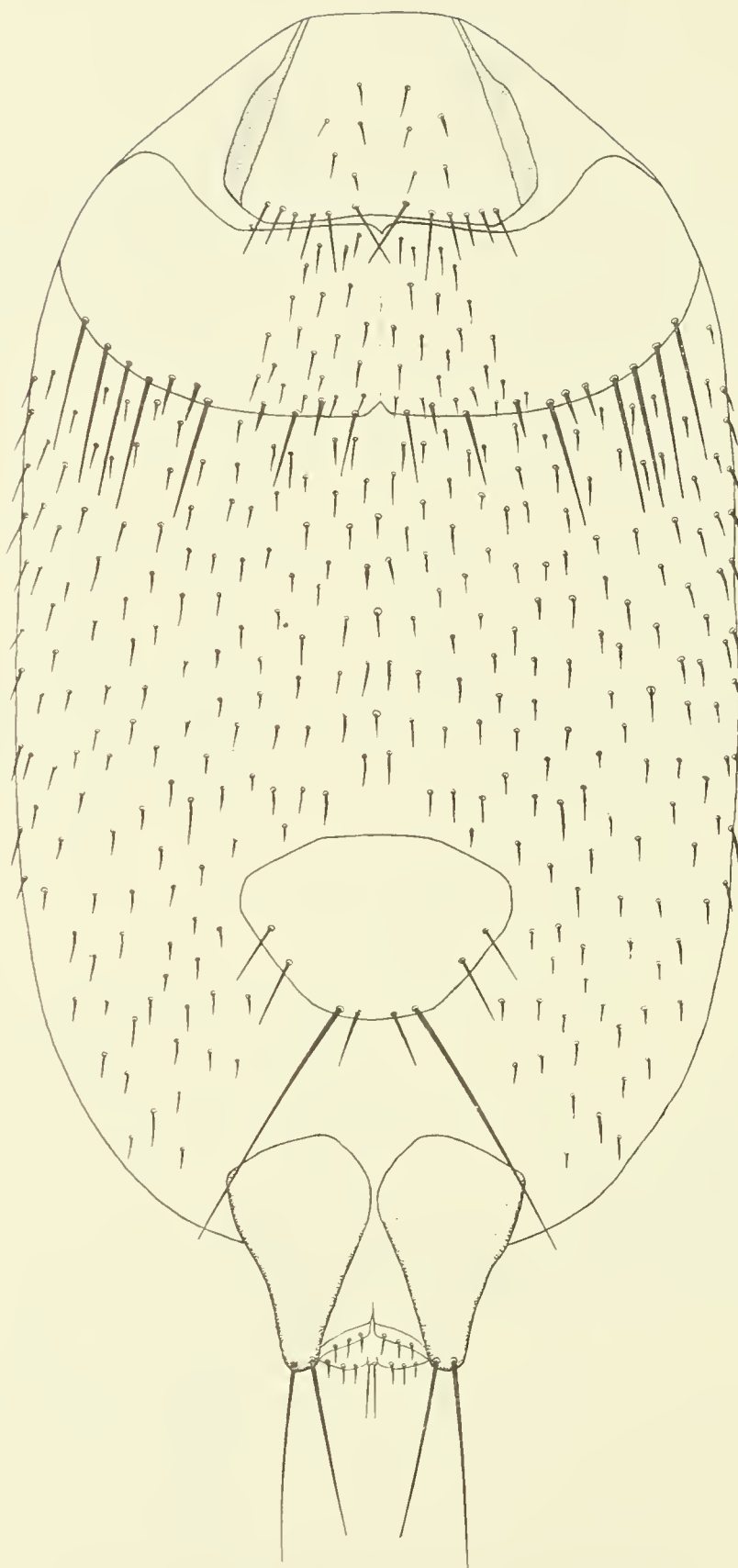
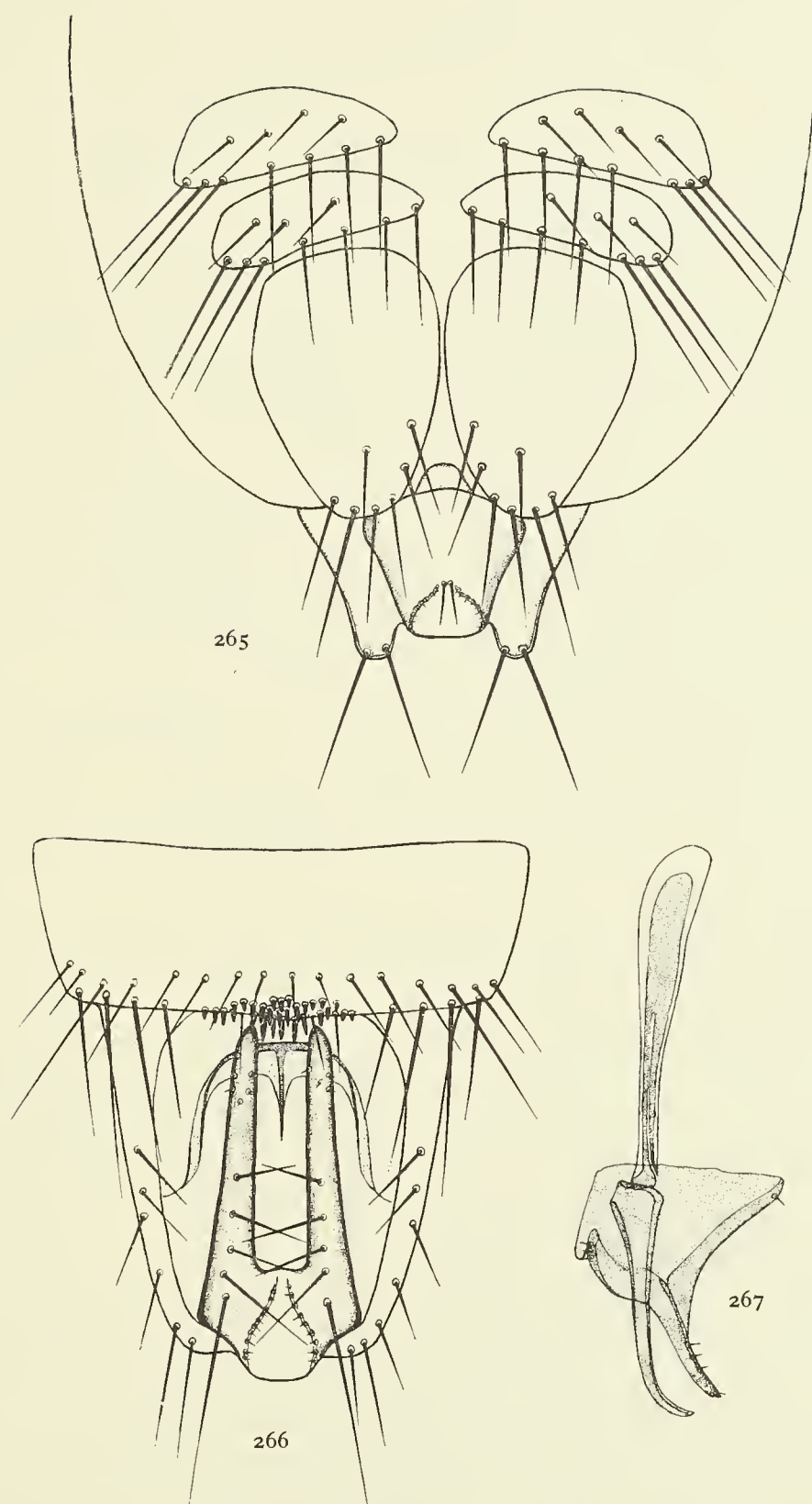


Fig. 264. *Stylidia psilotera* n.sp. Female abdomen, dorsal.





Figs. 265-267. *Stylidia psiloteria* n.sp. 265. female abdomen, ventral, posterior part; 266. male sternite 5 and genital area; 267. male genitalia.

sternite 4. Sternite 5 longer, with a group of 24–28 spines in the middle of the posterior margin. The spines are arranged in 2–4 rows and the median spines of the posterior row are longer than the others. Some long setae lateral to the group of spines and a premarginal row of long vertical setae.

*Genitalia.* Claspers straight, slender, with dark tips. A long seta dorsally near the base and shorter setae up to the middle. Basal arc broad, rounded, with a long posterior process. Aedeagus slender, curved, tapering to a sharp point. Parameres with a rounded base and a long apical process which curves upwards and bears a few short hairs dorsally and near the tip.

*Female abdomen.* Tergite 2 short, with a marginal row of short, thick setae and short spines in the middle. Surface covered with short hairs in the middle. Connexivum between tergites 2 and 6 covered with short spines which are shorter laterally. Tergite 6 triangular, with the apex posteriorly. 2 long setae at the apex and some short spines at the posterior margin and on the surface. Anal segment very small, conical, with 2 setae on the posterior processes which form rudimentary styles. Sternites 3 and 4 with marginal rows of moderately long setae and some short hairs on the surface. Sternites 5 and 6 with narrow lateral sclerites with 3–4 horizontal setae and 3 vertical setae laterally at the posterior margin. Sternite 7 divided into elliptical lateral sclerites which bear 3–4 long setae posteriorly and a few vertical setae near the margin. Genital plate projecting in the form of a shallow lip as in *S. scissa*.

JAVA. Bogor (Buitenzorg), Adensamer.

Type series in the Vienna Natural History Museum.

#### MATERIAL IN THE COLLECTION

JAVA

Bogor, 1 ♂ 1 ♀ paratypes.

### ***Stylidia rotundata* (Theodor, 1957)**

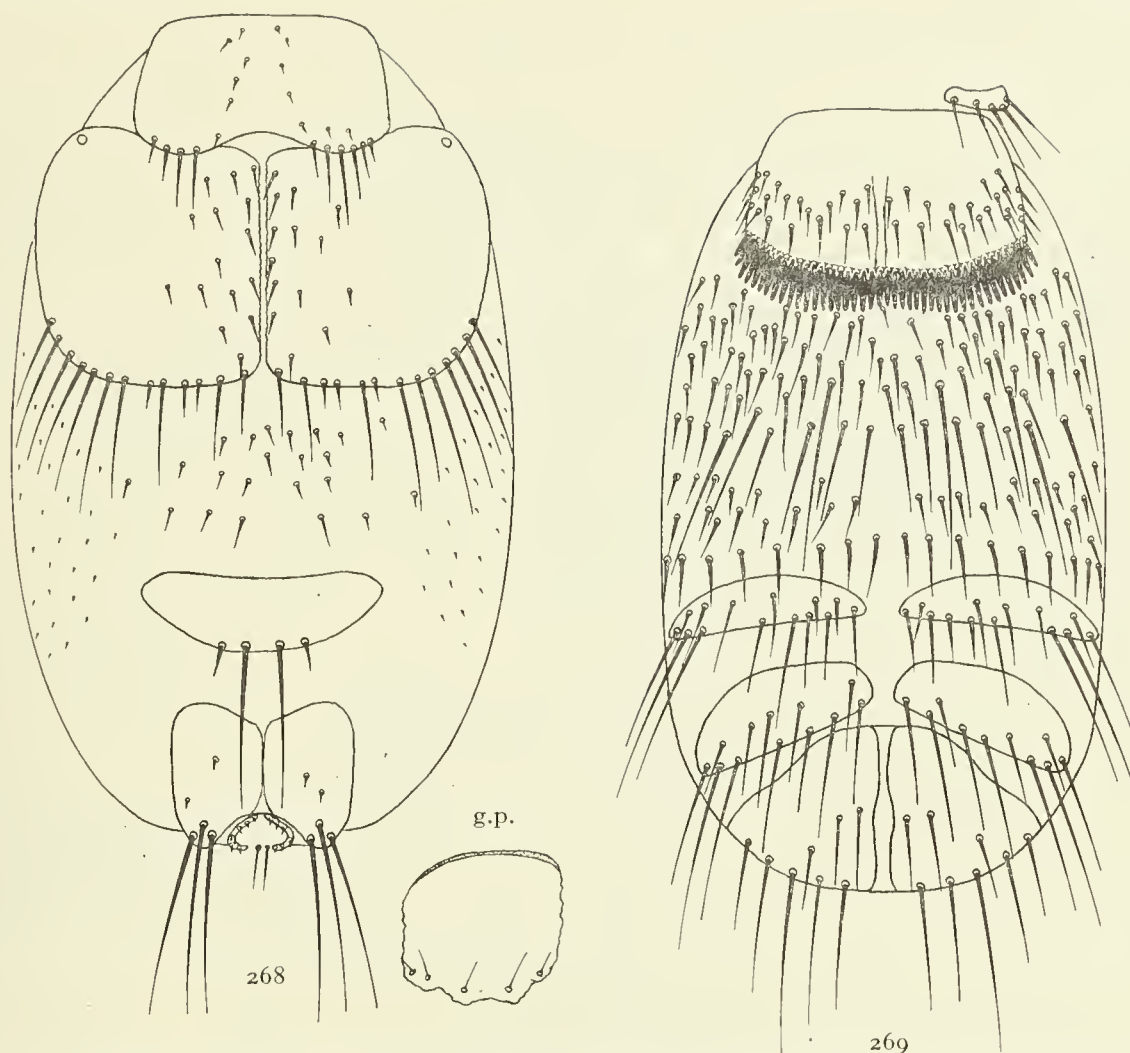
(Figs. 268, 269)

*Nycteribia rotundata*. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.5 mm. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis markedly longer than the theca.

*Thorax.* As long as wide. Angle of the oblique sutures about 80°. 4 setae at the posterior margin of the sternal plate at each side, one of which is very long. 8 notopleural setae. Legs relatively short, femur 3 shorter than the thorax + sternite 1 + 2.

*Female abdomen.* Tergite 1 concave posteriorly, with a marginal row of 8–10 short setae with a wide gap in the middle. Tergite 2 very long, twice as long as tergite 1, divided in the middle, each half rounded, with a marginal row of about 10 setae in each half which are shorter and more widely spaced in the middle. Some short spines in the middle of the row and some short spines on the surface near the median line. Tergite 6 wide, in the shape of a narrow circular segment, with 2 long (?) and 2 short setae or spines at the posterior margin. (Setae missing.) 3–4 rows of short spines on the connexivum between tergites 2 and 6. Anal segment short, with 3 setae at the anal processes. Sternite 1 + 2 narrow, with a ctenidium of 44 spines. Sternite 5 divided into short lateral sclerites which reach nearly to the midline. They have a row of long and



Figs. 268, 269. *Stylidia rotundata* (Theodor). Female. 268. abdomen, dorsal, with genital plate; 269. same, ventral.

short setae posteriorly and some short setae on the surface. Sternite 6 with similar but longer sclerites. Sternite 7 wide, triangular, with a row of long setae posteriorly and a curved row of setae across the middle. Dorsal genital plate rectangular, with 5 minute hairs at the base and more heavily sclerotized along the distal margin. Anal sclerite absent, represented by 2 setae.

Male unknown.

#### MATERIAL IN THE COLLECTION

##### RHODESIA

Mazoe, from *Rhinolophus hildebrandti*, ♀ holotype, J. H. Darling, N. C. Rothschild (Brit. Mus. 1913.450).

#### *Stylidia szechuana* (Theodor, 1954)

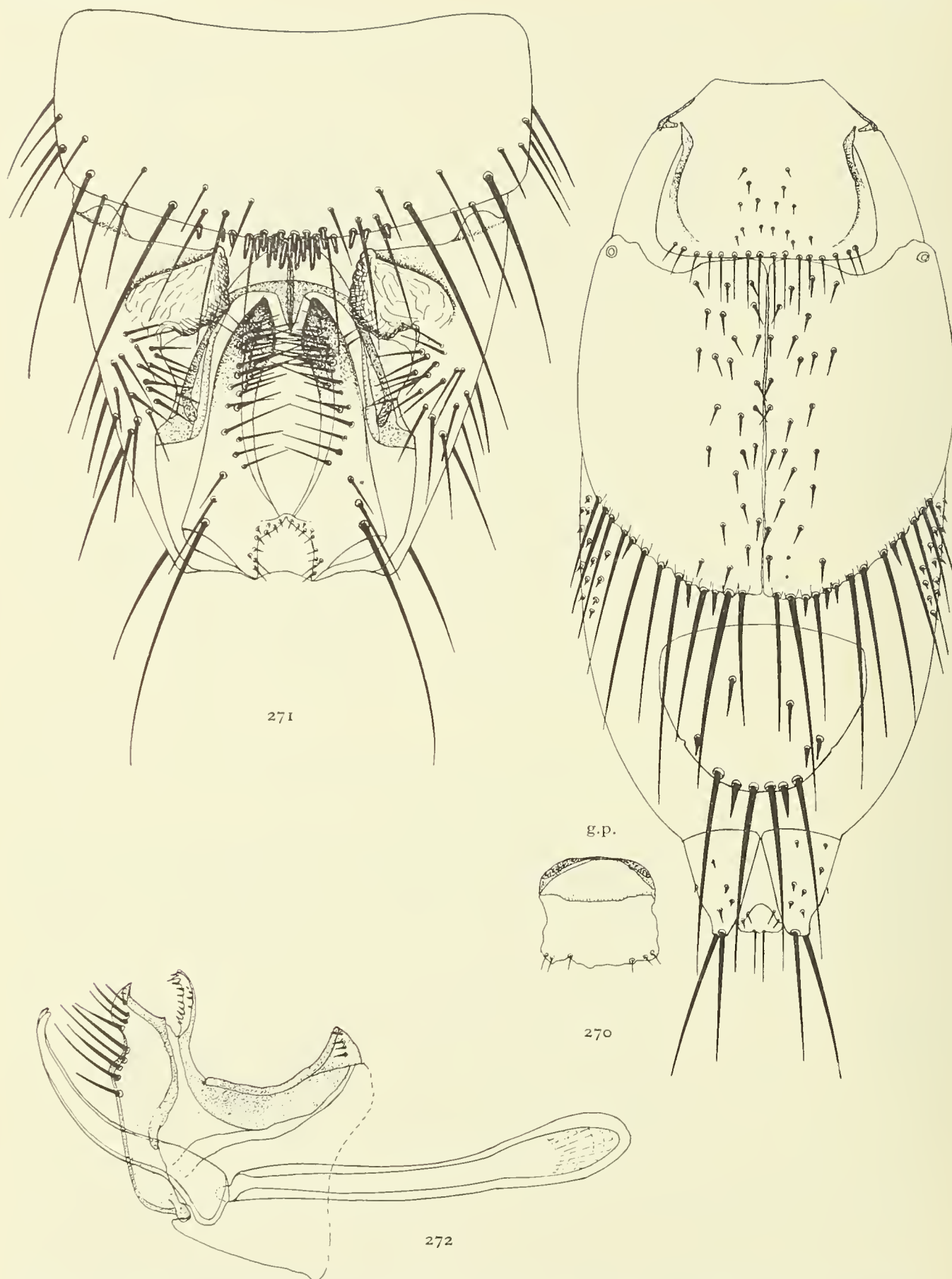
(Figs. 270-272)

*Nycteribia szechuana*. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 27.

Length 2 mm. Head and thorax as in *S. ornata*.

*Male abdomen*. As in *S. ornata*, but the hairs on the surface of tergites 2-4 are more numerous. Sternite 5 with nearly straight posterior margin with a group of short spines in 3 rows. The





Figs. 270-272. *Stylidia szechuana* (Theodor). 270. female abdomen, dorsal, with genital plate; 271. male sternite 5 and genital area; 272. male genitalia.

median spines of the posterior row are about twice as long as those of the anterior row which reaches further laterally.

*Genitalia.* Claspers thick, straight, with a sharp point, darkly pigmented in the distal half. Phallobase with a similar serrated process as in *S. ornata*. Aedeagus less curved than in *S. ornata* and with a bifid tip. (This may be an artefact.) Parameres with a strongly curved apical process and a marked ventral hump.

*Female abdomen.* Tergite 1 with a marginal row of short setae. Tergite 2 rounded, with a row of long setae and some spines in the middle of the posterior margin. 2–3 rows of short hairs along the median line. Tergite 6 roughly triangular, with 4 setae and a few spines at the posterior margin and a few short setae on the surface. Connexivum between tergites 2 and 6 bare. Anal segment short, conical, with a few setae posteriorly and a few very short spines on the dorsal surface. Abdominal ctenidium with 45 spines. Sternites 5 and 6 divided into elliptical lateral sclerites with concave posterior margin. Sternite 7 divided into nearly square lateral plates. Genital plate broad, nearly square, with rounded, more heavily sclerotized apical margin and 6 minute hairs at the base.

CHINA. Kwan Yen Chiao, Szechuan, from *Rhinolophus cornutus szechwanus*, 3.ix.1931, ♂ holotype and ♀ paratype, F. T. Smith, Chicago Natural History Museum.

## HOST SYNONYMY

Name on original label  
*Rhinolophus blythi szechwanus* Andersen.

Current name  
*R. cornutus szechwanus* Andersen.

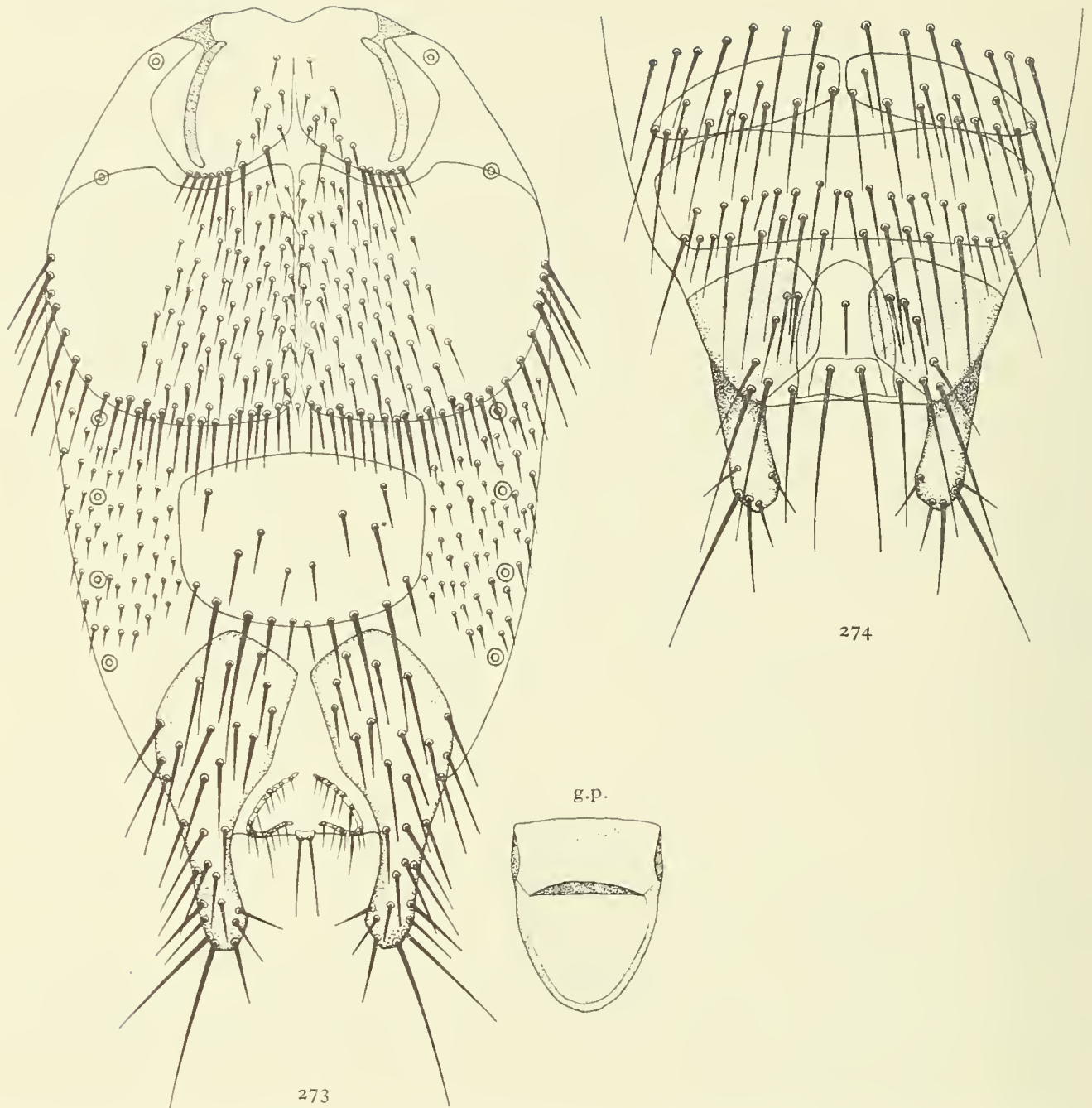
**Stylidia styligera** n.sp.

(Figs. 273, 274)

Length 2.5 mm. Colour brown. Head with 4–6 setae at the anterior dorsal margin. Labella of the proboscis as long as the theca.

*Thorax.* As long as wide. Lateral plates of the notopleural sutures wide. 12–13 notopleural setae which reach to near the anterior spiracle. 3 setae at the posterior margin of the sternal plate at each side. Tibiae with long tapering ends, 4.5–5 times as long as wide. Groups of minute hairs on tibiae 1 and 3 as in *S. biarticulata*.

*Female abdomen.* Post-spiracular sclerite rudimentary, without setae. Tergite 1 with a deeply concave posterior margin with a marginal row of short setae with a wide gap in the middle. Tergite 2 large, rounded, divided in the middle, with a marginal row of long spines or short setae in the middle and longer and more widely spaced setae laterally. Median part of the surface covered with short hairs which become longer posteriorly. Tergite 6 rectangular, with 4 long setae and some long spines in the marginal row and some spines on the surface. Connexivum between tergites 2 and 6 bare. Anal segment with two lateral sclerites which are prolonged posteriorly into long styles, similar to those of *S. biarticulata*, with 2–3 long setae and some spines at the tip. There are spines also on the dorsal surface of the sclerites and along the stem of the styles. Pleurae covered with short spines. Sternite 1 + 2 with a ctenidium of 55 long spines and several rows of long spines on the surface, about 3 rows in the middle and 4–5 laterally. Sternite 3 with long setae in the marginal row and shorter setae and 4 long vertical setae on the



Figs. 273, 274. *Stylidia stylicera* n.sp. Female. 273. abdomen, dorsal, and genital plate; 274. same, ventral, posterior part.

surface. Sternite 4 similar, with shorter setae in the marginal row and 1-2 rows on the surface. Sternite 5 with lateral sclerites which reach the midline, with short horizontal setae in the marginal row and 2-4 long vertical setae laterally. Sternite 6 undivided, with a similar arrangement of setae. Sternites 5 and 6 both with a transverse row of short vertical setae on the surface. Sternite 7 with nearly square lateral sclerites, one long seta at the lateral posterior corners and several short vertical setae on the surface. Genital plate shield-shaped, large, rounded posteriorly, without hairs. There is a small anal sclerite with 2 long setae.

Male unknown.



*S. styligera* is closely related to *S. biarticulata*, but differs from it in the structure of the abdominal sclerites and in details of chaetotaxy.

BORNEO. Sandakan district, Sagapaya Forest Reserve, from *Rhinolophus borneensis*, 20.vii.1950, R. F. Inger & D. Davies, Borneo Zool. Expedition 1950, ♀ holotype. Chicago Natural History Museum.

SARAWAK. Long Lobang, from bats, 26.vi.1950, Harrison, Insoll, Johan, 1 ♀ paratype. RTB-7824. Chicago Natural History Museum.

### ***Stylidia tecta* (Theodor, 1957)**

(Figs. 275-282)

*Nycteribia tecta*. Theodor, 1957, *Parasitology*, **47**, 457.

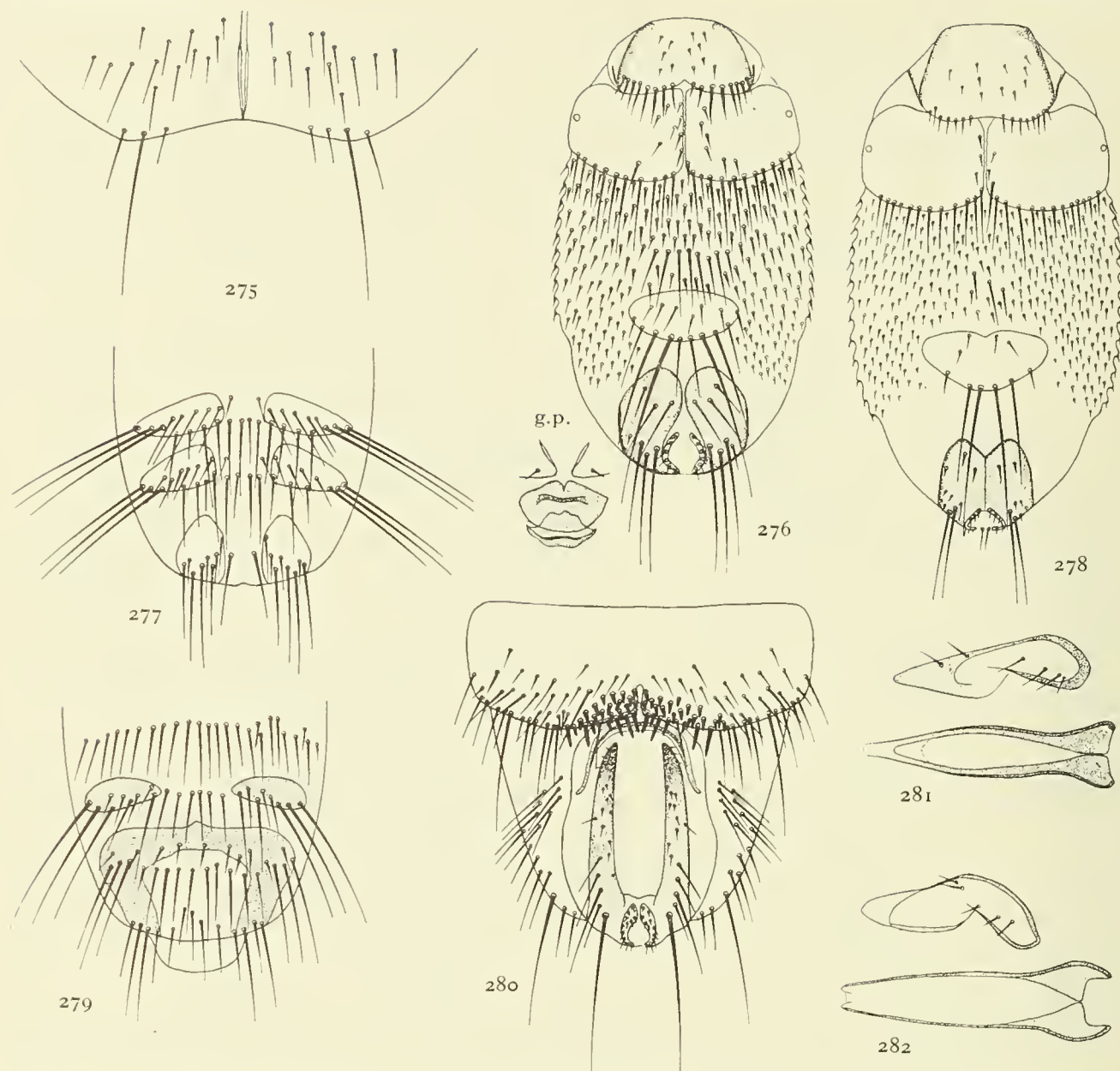
Length 2.2-2.5 mm. Head as in *S. scissa*. Thorax as long as wide. Angle of oblique sutures about 80°. 3 setae at the posterior margin of the sternal plate at each side; 9-10 notopleural setae. Legs as in *S. scissa*, but shorter.

*Male abdomen*. Tergites 2 and 3 incompletely divided in the middle, with marginal rows of moderately long setae. 8-10 short setae in each half near the median line. Tergites 4-6 undivided, with 6-8 short setae on tergite 4, a few or none on tergites 5 and 6. 2 long setae in the marginal row of tergites 5 and 6. The lateral setae of the marginal rows are very short. Anal segment short and broad, rounded, with 2-3 rows of short setae dorsally and some long setae posteriorly. Ventral surface similar to that of *S. scissa*. The posterior median indentation of sternite 5 is very small. The arrangement of the spines on sternite 5 is also similar to that in *S. scissa*, but the posterior row consists only of 3-4 spines of medium length and of short spines, the very long spines of *S. scissa* being absent.

*Genitalia*. Similar to *S. scissa*, but the aedeagus is more pointed in dorsal view and the parameres are only slightly shorter than the aedeagus. They have a rather narrow, pointed apical end and a row of 7 short spines in the basal part.

*Female abdomen*. Tergite 2 with a marginal row of about 10 long setae in each half. A double row of short setae near the median division line and a few further laterally. Tergite 6 transversely elliptical with 4 very long and 4 shorter setae posteriorly and a few short setae on the surface. Connexivum between tergites 2 and 6 covered with long spines anteriorly and short spines posteriorly. A row of about 8 moderately long setae in the middle. Anal segment short, with 3 long setae posteriorly on each side and some short setae on the surface. Abdominal ctenidium with 48 spines. Sternite 5 divided into lateral sclerites with 4-5 long, horizontal setae in the marginal row and some short setae on the surface; 3 long vertical setae laterally. Sternite 6 similar. Sternite 7 broadly rounded, with rounded lateral sclerites which bear groups of longer and shorter setae posteriorly. Dorsal genital plate large, semicircular, without setae, covering the genital opening from above. Ventral plate triangular.

Distribution and hosts: East and South Africa, from species of *Rhinolophus* and *Miniopterus*. Type series in the Chicago Natural History Museum.



Figs. 275-282. *Stylidia tecta* (Theodor). 275. posterior margin of sternal plate of thorax; 276. female abdomen, dorsal, and genital plates; 277. same, ventral, posterior part; 278. female abdomen, dorsal, of ?subsp.; 279. same ventral, posterior part; 280. male sternite 5 and genital area; 281. aedeagus, dorsal, and paramere; 282. same of *tecta* ?subsp.

MATERIAL IN THE COLLECTION

TANGANYIKA

Ujiji, from *Rhinolophus* sp., 1 ♂ 1 ♀.

KENYA

Kapretwa, Kitale, from *Rhinolophus schreibersi arenarius*, 15.i. 1957, O. Theodor, 1 ♀.

SOUTHERN RHODESIA

Odzi, from *Hipposideros caffer*, 19.ii. 1948, N. C. E. Miller, 1 ♀.

Odzi, from *Rhinolophus darlingi*, 27.ix. 1948, N. C. E. Miller, 1 ♂.

Odzi district, from *Miniopterus schreibersi natalensis*, 27.ix. 1948, N. C. E. Miller, 1 ♀.

TRANSVAAL

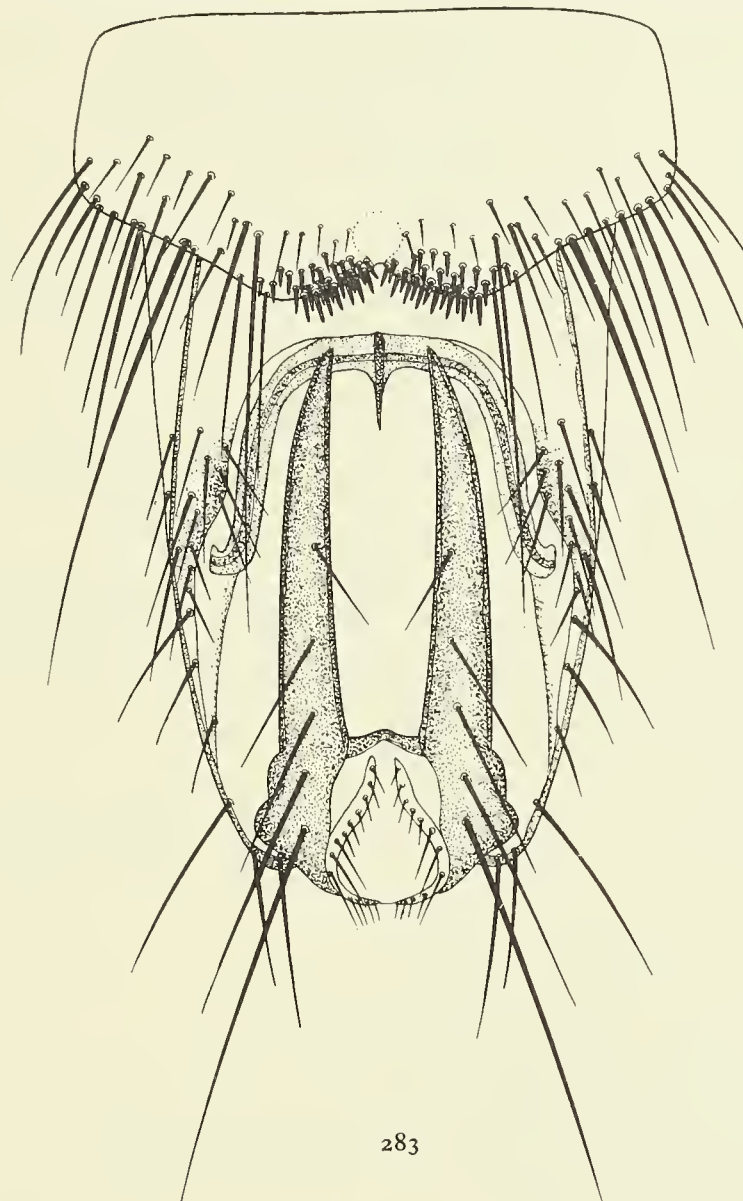
Onderstepoort, Pretoria, from *Rhinolophus darlingi*, Mar. 1927, G. A. H. Bedford, 1 ♀.

The specimens from Rhodesia differ from the typical form in some details and may prove eventually a distinct subspecies.

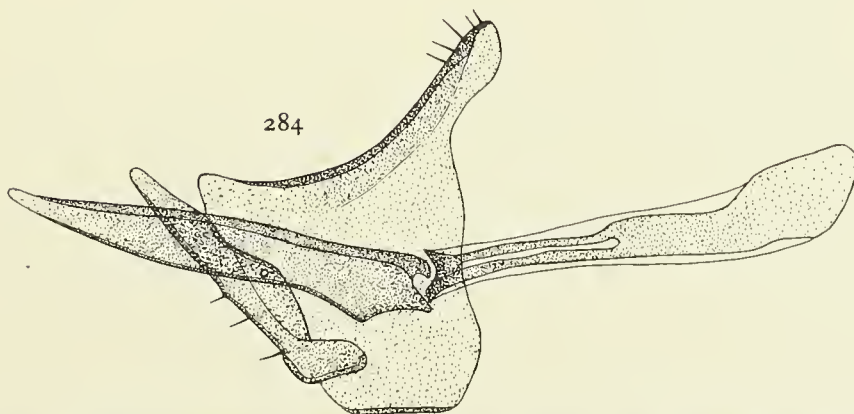
*Stylidia tonkinensis* n.sp.

(Figs. 283, 284)

Length 3.2–3.5 mm. Colour brown. Head with 6 setae at the anterior dorsal margin.

*Thorax.* Angular anteriorly, slightly longer than wide. Angle of oblique sutures  $75^\circ$ . 3-4

283



284

Figs. 283, 284. *Stylidia tonkinensis* n.sp. Male. 283, sternite 5 and genital area; 284, genitalia.



setae at the posterior margin of the sternal plate at each side. 11–12 notopleural setae which reach nearly to the anterior spiracle. Tibiae 4.5 times as long as wide.

*Male abdomen.* Tergite 1 with a single marginal row of thin setae. Tergites 2 and 3 with marginal rows of moderately long, thick setae and some shorter setae. Surface covered with short hairs in its greater part. Both tergites incompletely divided. Tergites 4 and 5 short, with the setae of the marginal rows more widely spaced and longer in the middle. A group of short hairs in the middle of the surface. Tergite 6 very short, deeply concave anteriorly and strongly convex posteriorly. It is less wide than tergite 5. The marginal row consists of 4 very long setae in the middle and shorter setae laterally. These setae alternate with very thin, short setae. Anal segment long, narrow, rounded posteriorly and with deeply concave anterior dorsal margin. Sternite 1 + 2 with a ctenidium of 50 spines, the greater part of the surface covered with short hairs. Sternites 3 and 4 with marginal rows of moderately long, thick setae and 4 long, vertical premarginal setae. Sternite 5 longer, with convex posterior margin and a narrow incision in the middle. There are 2 groups of about 25 spines each in 4 rows at the sides of the median incision, all directed posteriorly. Those of the posterior rows are longer than those of the anterior rows. Long and short setae laterally near the posterior margin. Surface otherwise bare. There are groups of setae at the sides of the anal segment on the ventral side.

*Genitalia.* Basal arc broadly rounded. Claspers long, dark, tapering to long points. A long seta dorsally near the base and shorter setae up to the middle. Aedeagus straight, tapering to a rounded point. Parameres triangular, with a straight apical process and rounded tip. 3 or 4 short hairs near the base at the ventral edge.

Female unknown.

INDOCHINA. Chapa, from *Rhinolophus pearsoni chinensis*, 19.ii.1929, R. Wheeler, ♂ holotype. Museum of Comparative Zoology, Harvard. 1 ♂ paratype, Department of Parasitology, Hebrew University.

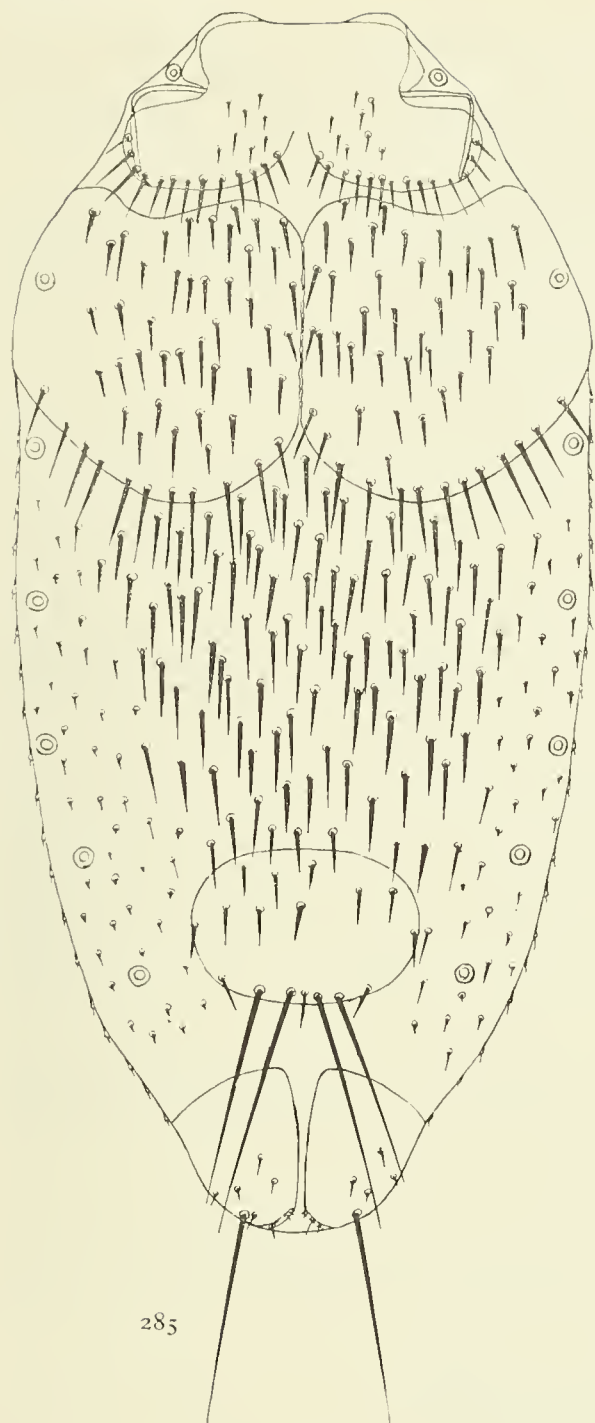
### ***Stylidia torresi* n.sp.**

(Figs. 285–288)

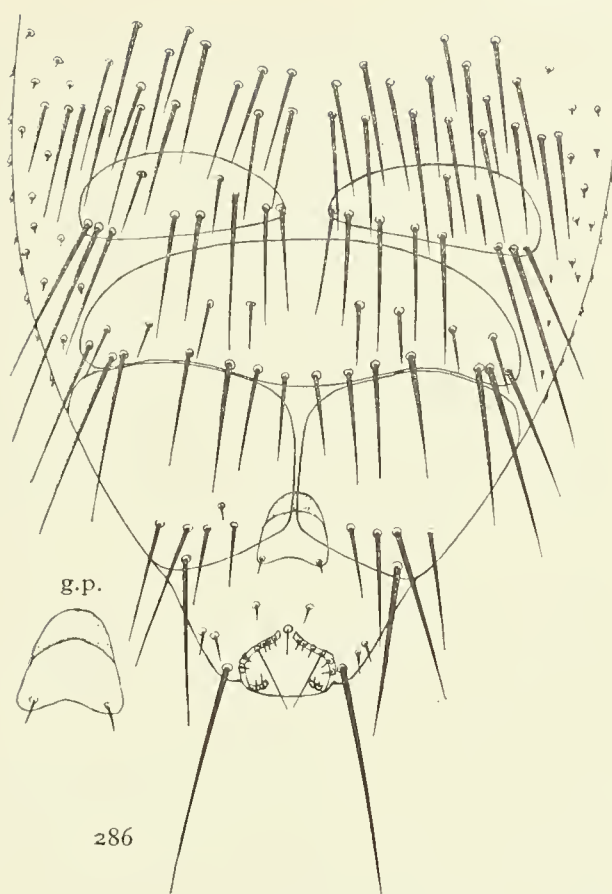
Length 2.5 mm. Colour brown. Head with 6 setae at the anterior margin.

*Thorax.* Slightly longer than wide. Angle of oblique sutures 75–80°. 10–12 notopleural setae which reach to near the anterior spiracle. 3 setae at the posterior margin at each side. Tibiae 4.5 times as long as wide.

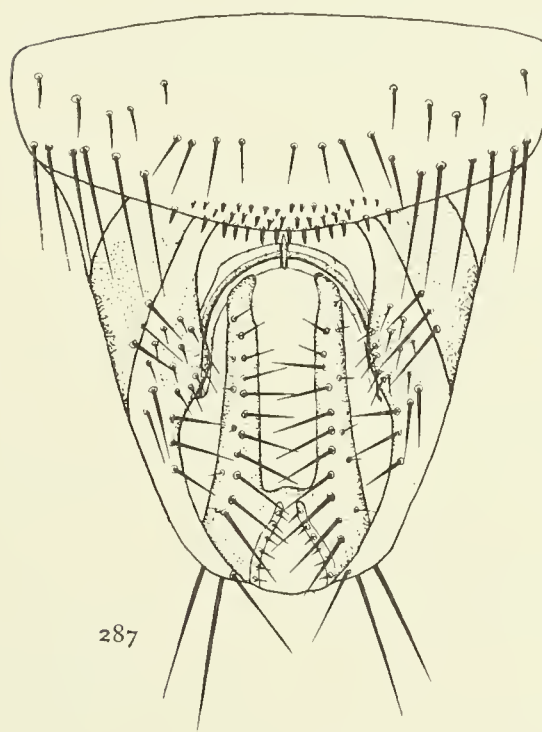
*Male abdomen.* Tergite 1 with a double marginal row of short setae. Tergites 2 and 3 divided in the middle, with marginal rows of moderately long, thick setae; the greater part of their surface covered with short hairs. Tergites 4–6 with similar marginal rows, but the setae are more widely spaced. Tergites 4 and 5 are incompletely divided by an incision of the anterior margin. There is a group of hairs on the surface of tergite 4 and only a few hairs on tergite 5. Tergite 6 bare. Anal segment conical, with a deep, angular incision of the anterior dorsal margin which reaches as a pale stripe to the posterior margin. Sternite 1 + 2 with a ctenidium of 45 long spines and with 2–3 rows of short setae on the surface. Sternites 3 and 4 with marginal rows of moderately long, thick setae. 2 premarginal, long, vertical setae on sternite 4. Sternite 5 slightly



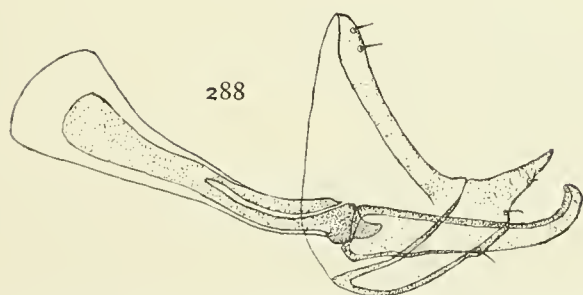
285



286



287



288

Figs. 285-288. *Stylidia torresi* n.sp. 285. female abdomen, dorsal; 286. same, ventral, posterior part, and genital plate; 287. male sternite 5 and genital area; 288. male genitalia.

convex posteriorly, with a group of about 40 very short spines in 3 rows at the posterior margin, those of the posterior row only little longer than those of the anterior rows. There is a row of vertical premarginal setae and long and short setae lateral to the group of spines. The basal bulges of the anal segment are weakly developed.

*Genitalia.* Claspers straight, tapering to a dark point. A long seta dorsally near the base and shorter setae up to the apical third. Basal arc rounded, with a short posterior process. Aedeagus short, tapering to a rounded tip which is turned upwards. Parameres with short, sharp apical point and a small ventral bulge. 2-3 hairs at the ventral edge near the tip.

*Female abdomen.* Tergite 1 with a marginal row of short, thick setae, deeply divided. Tergite 2 divided, nearly hexagonal, with short, thick setae at the posterior margin and the greater part of the surface covered with short hairs. Connexivum between tergites 2 and 6 covered with short, thick setae like those of the marginal row of tergite 2. Laterally and on the pleurae the spines are very short and reach posteriorly to the hind margin of tergite 6. This is elliptical, with 4 long setae in the middle of the posterior margin and a few short spines at the hind margin and on the surface. Anal segment short, conical, with one long seta at the posterior processes and a few short spines on the dorsal surface. Sternites 3 and 4 thickly covered with moderately long, thick setae. 4 long vertical premarginal setae on sternite 3. Sternite 5 with narrow elliptical lateral sclerites with 5 horizontal marginal setae and 3 vertical lateral setae. A row of short vertical setae on the surface. Sternite 6 undivided, with 7 horizontal marginal setae and 3 vertical setae laterally. A row of short vertical setae on the surface. Sternite 7 trapezoidal, with concave posterior margin, divided in the middle, with a long horizontal seta laterally and a row of 4 premarginal setae at each side. Genital plate shield-shaped, rounded posteriorly, with 2 minute hairs at the base.

The species is related to *S. curvata*, from which it differs in the form of the aedeagus and the group of spines on sternite 5 in the male and in the chaetotaxy of the abdomen in the female.

## MATERIAL IN THE COLLECTION

## AUSTRALIA

Cape York, Queensland, from *Hipposideros cervinus*, ♂ holotype, 1 ♀ paratype, Challenger Expedition. 1882.

## OTHER MATERIAL EXAMINED

## NEW GUINEA

Papua, Gwariu River near Biniguni, 5.viii. 1953, van Deusen, 1 ♂. RTB-22300.

## HOST SYNONYMY

<i>Name on original label</i>	<i>Current name</i>
<i>Phyllorhina cervina</i> Gould.	<i>Hipposideros cervinus</i> Gould.

***Stylidia traubi* n.sp.**

(Figs. 289, 291-293)

Length 2.5 mm. Colour brown. Head with 2 setae in the middle of the anterior margin and 2-3 more laterally.

*Thorax.* Slightly longer than wide. Angle of the oblique sutures 75°. 8-9 notopleural setae. Lateral plates of the notopleural sutures very narrow near the base of the mesopleural suture.

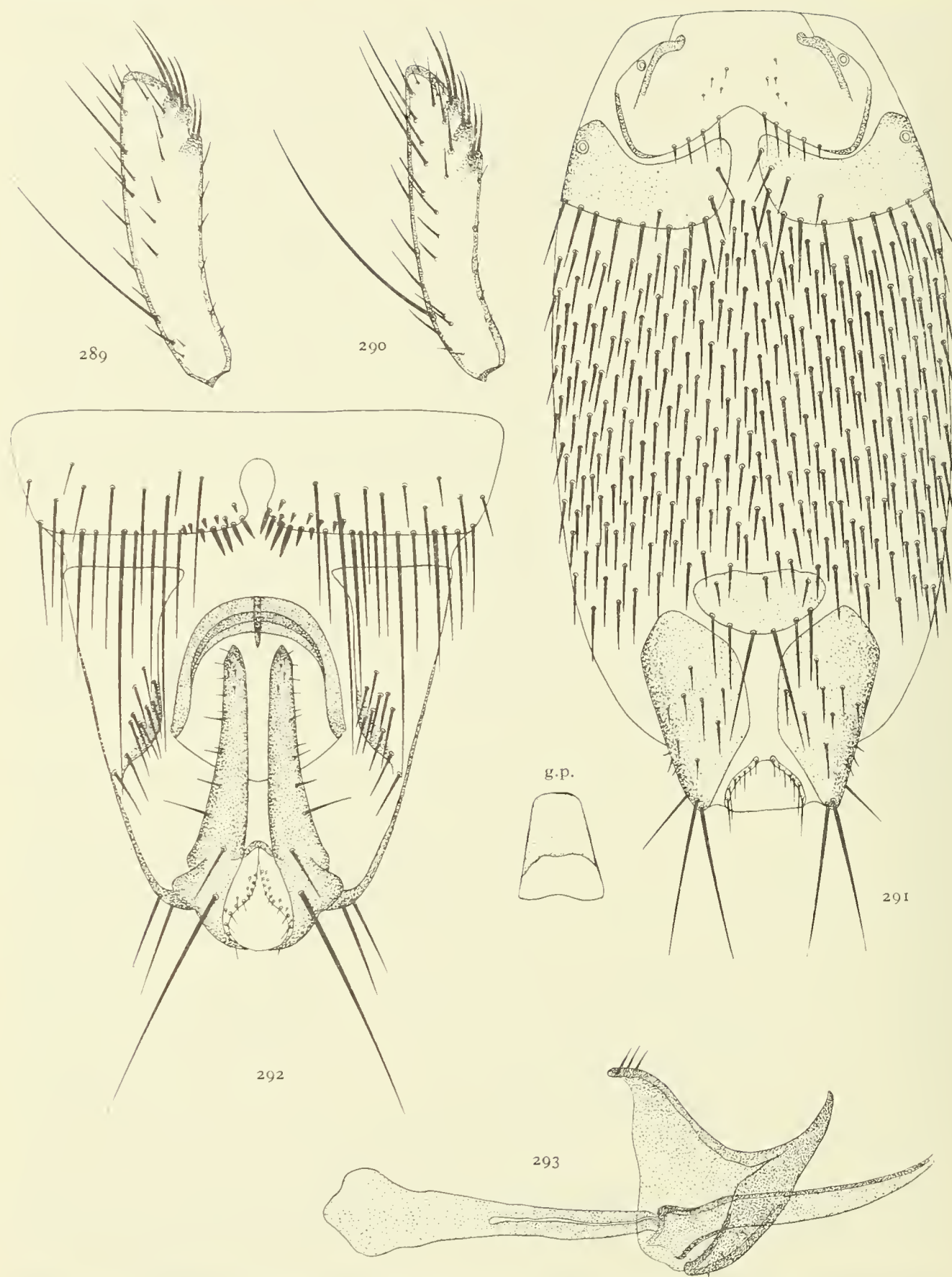


3 setae at the posterior margin of the sternal plate at each side. Tibiae 4 times as long as wide, with strongly curved, short apical end.

*Male abdomen.* Post-spiracular sclerite slender, with 3–4 short spines. Tergite 1 concave posteriorly, divided in the middle, with a marginal row of 4–5 spines at each side. Tergites 2–4 divided into lateral sclerites, those of tergite 2 curved posteriorly, leaving a narrow strip of connexivum between them. Tergites 3 and 4 more widely separated. The marginal rows consist of short, thick setae. The median half of the sclerites of tergite 2 are covered with short hairs. Only a few such hairs at the inner corners of the sclerites of tergites 3 and 4 and on the connexivum between the sclerites. Tergites 5 and 6 undivided, convex posteriorly, with similar marginal rows, but the setae are more widely spaced and the median 2 setae are longer. Only a small group of short hairs in the middle of the surface. Anal segment short, with a concavity of the anterior dorsal margin. Sternite 1 + 2 with a ctenidium of about 40 spines and 2–3 rows of short setae on the surface, the setae more densely arranged laterally. Sternites 3 and 4 with dense marginal rows of moderately long, thick setae and 2 long premarginal vertical setae on sternite 3, 4 such setae on sternite 4. Sternite 5 with a straight posterior margin with a rounded notch in the middle which has a narrow opening. There are 3–5 long spines on each side of this opening and 1–2 rows of 8–10 shorter spines. There are long and short setae laterally and a row of premarginal setae. Anal segment ventrally with a double row of setae at the sides.

*Genitalia.* Basal arc rounded with a short posterior process. Claspers straight, with darkly pigmented, blunt tips. A long seta dorsally near the base and shorter setae up to the middle. Phallobase short, with a group of about 10 short hairs near the basal articulation. Aedeagus nearly straight, 0.26 mm. long, very narrow, tapering to a sharp point. Apodeme long, with a moderately wide end plate. Parameres with a long apical process, slightly curved upwards, with only a few minute hairs near the base.

*Female abdomen.* Tergite 1 as in the male. Tergite 2 divided into elliptical lateral sclerites with a narrow strip of connexivum between them, with marginal rows of moderately long, thick setae and a few shorter in the middle. 4–5 short setae on the surface at the inner corners of the sclerites. Connexivum behind tergite 2 covered with long spines or short setae of uniform size which reach laterally beyond the posterior margin of tergite 6 and on to the pleurae. Tergite 6 short, transversely elliptical, with 6 setae at the posterior margin, 2 long vertical setae in the middle and horizontal setae laterally. Anal segment short, conical, with 3 long setae at the posterior processes and some short setae on the dorsal surface. Sternite 1 + 2 as in the male. Sternites 3 and 4 membranous, with uniform marginal rows of moderately long setae and with closely placed shorter setae on the surface. 6 long vertical setae in a curved row on sternite 3. Sternites 5 and 6 with small, narrowly elliptical lateral sclerites which bear 3 long vertical setae laterally and horizontal setae at the posterior margin. 4–6 setae between the sclerites of sternite 5. The sclerites of sternite 6 reach to the midline. They are larger, have 4–6 setae at the posterior margin, short vertical setae on the surface and 3 long vertical setae laterally. Sternite 7 trapezoidal, with a concave posterior margin and 2 more heavily pigmented areas laterally. One horizontal and several vertical setae near the posterior margin. Anal segment with a single seta on the ventral surface of each sclerite. Genital plate oblong, rounded posteriorly, without setae, 0.15 × 0.13 mm.



Figs. 289-293. *Stylidia* spp., *S. fraterna* n.sp. 290. tibia 1; *S. traubi* n.sp. 289. tibia 1; 291. female abdomen, dorsal, and genital plate; 292. male sternite 5 and genital area; 293. male genitalia.

MALAYA. Bukit Lagong Forest Reserve, from *Hipposideros* sp., 13.iii.1950, 3 ♀; RTB-9424-26; 17.iii.1950, ♂ holotype, 3 ♂ 6 ♀ paratypes, RTB-9487-93, R. Traub. Chicago Natural History Museum.

Kepong, Selangor, from *Cynopterus brachyotis*, 1950, 2 ♂ 6 ♀ paratypes, R. Traub, RTB-5000-5006, 5008-5009. Chicago Natural History Museum.

Kepong, Selangor, from *Megaerops ecaudatus*, 1950, R. Traub, 1 ♂, RTB-5007.

Selangor, from *Hipposideros* sp., 25.ii.1952, 2 ♂ 2 ♀, RTB-22885-87; 28.viii.1953, 1 ♂, R. Traub, B-30080, paratypes. U.S. National Museum.

RHIO LINGUA ARCHIPELAGO. Pulo Bintang, from *Emballonura monticola*, viii.1902, W. L. Abbott, 1 ♀.

## MATERIAL IN THE COLLECTION

## MALAYA

Kepong, Selangor, from *Cynopterus brachyotis*, 1950, R. Traub, 1 ♂ 1 ♀ paratypes.

## HOST SYNONYMY

Name on original label	Current name
<i>Emballonura peninsularis</i> Miller.	<i>Emballonura monticola</i> Temminck.

A single male from Borneo, Sarawak, Long Lobang, 26.vi.1950, resembles *S. traubi* closely, but differs in a number of details. This may eventually prove a subspecies of *S. traubi*.

## SCISSA GROUP

**Stylidia scissa scissa** (Speiser, 1901)

(Figs. 294-304)

*Nycteribia (Acrocholidia) scissa*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia scissa* Speiser. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Nycteribia (Stylidia) scissa* Speiser. Theodor, 1957, *Parasitology*, **47**, 457.

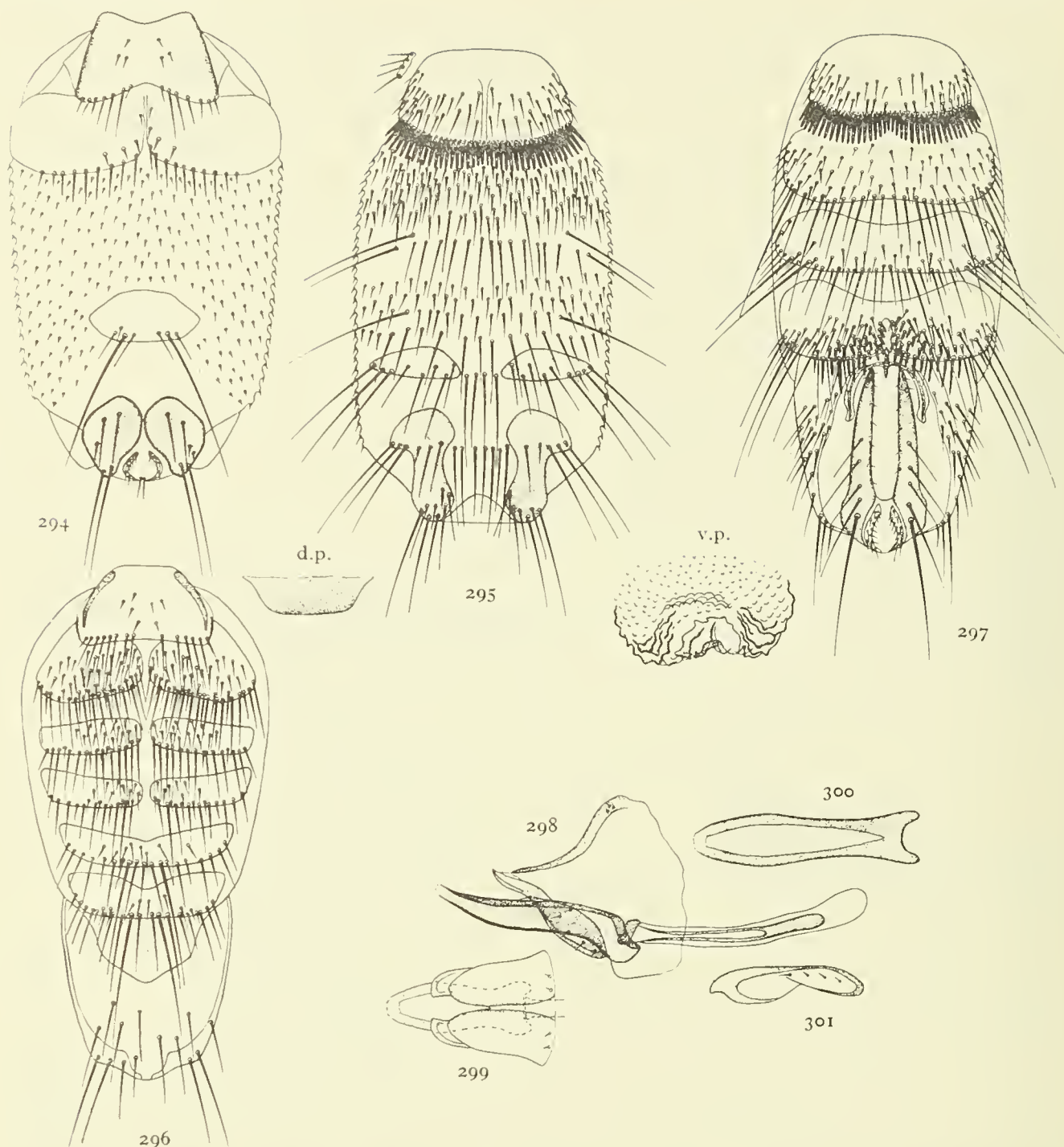
Length 2.5-2.7 mm. Colour light brown.

*Head*. Broadly rounded, not laterally compressed, sclerotized up to the anterior margin. This forms an angle which bears 3 setae at each side.

*Thorax*. As long as wide. Angle of the oblique sutures about 80°. Only a single short seta at the posterior margin of the sternal plate at each side. 7-8 notopleural setae which do not extend beyond the base of the mesopleural suture. Legs long. A row of strong setae on the femora proximal to the basal ring, best marked on femur 3. Tibiae 4.5-5 times as long as wide. Hind femur as long as thorax and sternite 1 + 2 together.

*Male abdomen*. Tergite 2 shorter than that of the female, divided and the marginal setae longer and thinner. The greater part of the surface is covered with short setae. Tergites 3 and 4 also divided into lateral sclerites, with marginal rows as on tergite 2 and with short setae on the median part of the surface. Tergites 5 and 6 undivided, with long setae in the middle of the marginal rows. A few short setae on the surface. Anal segment broad, rounded, with deeply concave anterior dorsal margin. A few setae on the dorsal surface and some longer setae posteriorly. Sternite 5 with a narrow, deep indentation of the posterior margin. The groups of spines near the indentation consist of about 4 rows in the middle and 2-3 rows laterally. The





Figs. 294-301. *Stylidia scissa scissa* (Speiser). 294. female abdomen, dorsal; 295. same, ventral, with genital plates; 296. male abdomen, dorsal; 297. same, ventral; 298. male genitalia, profile; 299. phallobase, dorsal; 300. aedeagus, dorsal; 301. paramere.

spines of the posterior row are short near the middle and become longer laterally. 2-3 spines at the side very long. The spines of the anterior rows are all short and of about equal length.

**Genitalia.** Basal arc broad, rounded, with a short posterior process. Claspers thick, nearly straight, tapering to a blunt, dark tip. Phallobase short, conical, divided by a dorsal slit. Aedeagus slightly curved in an S-shape in side view, with a blunt tip. Parameres short, with rounded base and with a broadly triangular apex in dorsal view.



Figs. 302-304. *Stylidia scissa scissa* (Speiser). 302. dorsal pattern of thorax, and ventral posterior margin of thorax; 303. leg 1; 304. leg 3.

*Female abdomen.* Tergite 1 with a marginal row of short setae with a gap in the middle. Tergite 2 incompletely divided in the middle. A marginal row of about 10 strong short setae in each half. Surface bare except for 3–5 spines along the median line and in front of the middle of the posterior margin. Tergite 6 large, transversely elliptical, with 2 long setae and several short setae near the posterior margin. Connexivum between tergites 2 and 6 and pleurae covered with short spines. The area behind tergite 6 bare. Anal segment very short, with 2 long setae and some short spines at the posterior processes and some short setae near the base. Sternite 1 + 2 rather short, with a ctenidium of 42–46 spines. Sternites 3 and 4 with uniform marginal rows of moderately long setae and with closely placed setae on the surface, which are only little shorter than the marginal setae. 2–4 vertical setae on the surface. Sternite 5 with small elliptical lateral sclerites with long setae posteriorly and a few short setae on the surface. The row of long setae continues between the sclerites. The lateral sclerites of sternite 6 are fused with those of sternite 7 to form a longitudinal strip. About 8 setae between the sclerites of sternite 6. The sclerites of sternite 7 bear longer and shorter setae in the posterior part. Dorsal genital plate very small, forming a lip. Ventral plate concave, with a crinkled surface.

## MATERIAL IN THE COLLECTION

## SOUTH AFRICA

Onderstepoort, Pretoria, from bat, 30.iii. 1916, G. A. H. Bedford, 1 ♂ 1 ♀.

Capetown, from *Rhinolophus capensis*, 1 ♀.

De Kaap, Transvaal, from *Rhinolophus clivosus augur*, P. Rendall, N. C. Rothschild, 2 ♂ (Brit. Mus. 1913.450).

Natal, from *Rhinolophus clivosus augur*, R. E. Wroughton, N. C. Rothschild, 1 ♀.

Sterkfontein caves, Kruegersdorp, Transvaal, from bat, 1933, G. Martinaglia, 1 ♂.

Waterberg, S.W. Africa, from *Rhinolophus clivosus augur*, May 1934, W. Hoesch, 1 ♂ (Brit. Mus. 1946.288).

Okahandja, S.W. Africa, from *Nycteris capensis*, *Hipposideros caffer* or *Rhinolophus eloquens*, W. Hoesch, 1 ♂.

## HOST SYNONYMY

Name on original label	Current name
<i>Rhinolophus geoffroyi</i> Smith.	<i>Rh. clivosus augur</i> Andersen.

**Stylidia scissa rhodesiensis** (Theodor, 1957)

(Figs. 305, 306)

*Nycteribia scissa rhodesiensis*. Theodor, 1957, *Parasitology*, **47**, 457.

Length 3 mm. Only 5–7 notopleural setae.

*Male abdomen.* Tergites 4 and 5 are nearly bare on the surface, except for a few short setae. The group of spines on sternite 5 has only spines of medium length in the posterior row.

*Female abdomen.* The posterior margin of tergite 1 is deeply concave. The marginal setae of tergite 1 and tergite 2 are much longer than in *S. s. scissa* and there are 2–3 rows of short setae on the surface of tergite 2. Tergite 6 as in *S. s. scissa*, but with short setae on the surface. The spines on the dorsum are longer than in *S. s. scissa*.

## MATERIAL IN THE COLLECTION

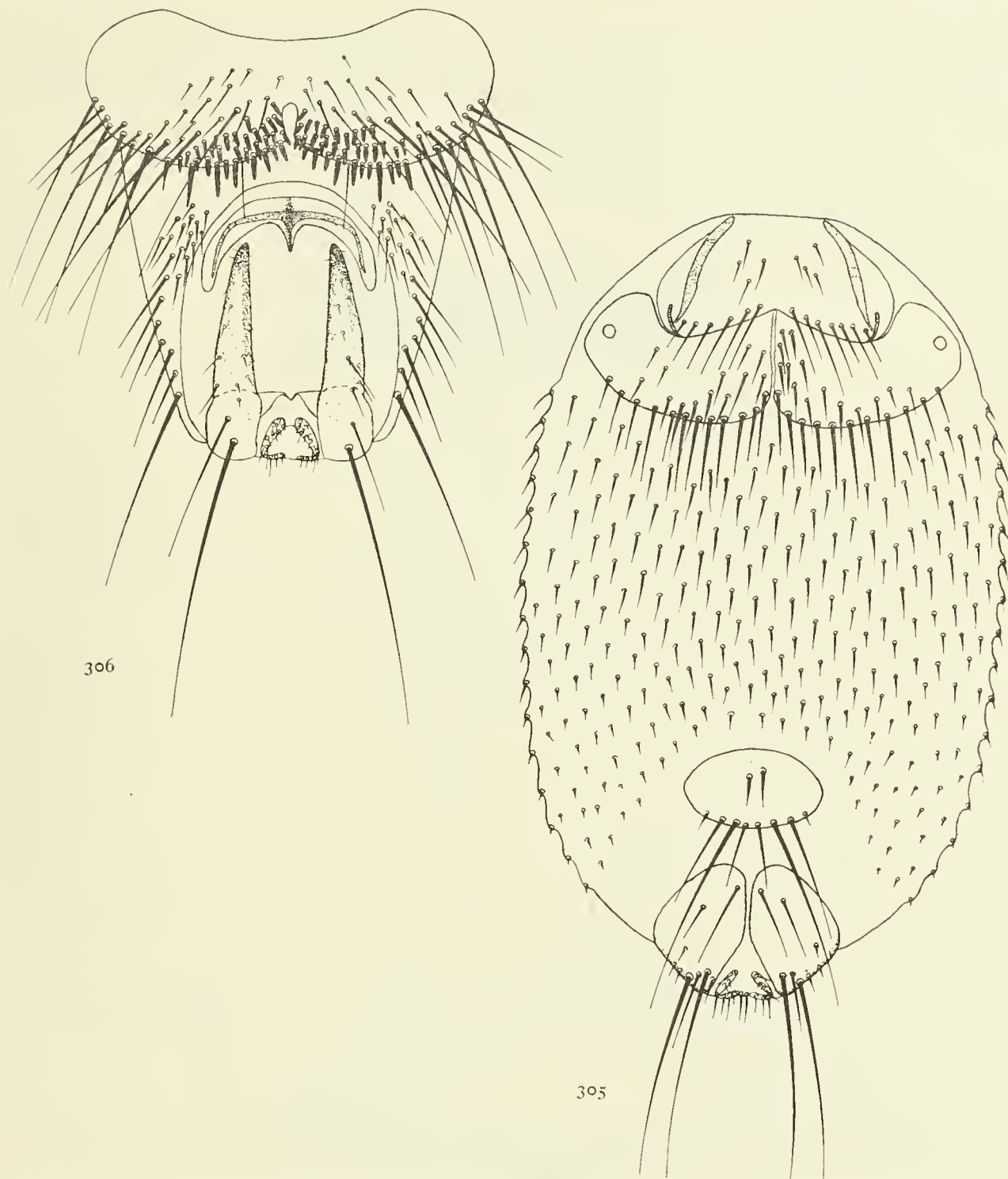
## RHODESIA

Mazoe, from *Rhinolophus hildebrandti*, ♀ holotype, 1 ♀ paratype, J. H. Darling, N. C. Rothschild (Brit. Mus. 1913.450).

Mareppa mine, Gwanda, from *Nycteris capensis*, 1 ♀ paratype, Carruthers, N. C. Rothschild.

Odzi district, from *Rhinolophus darlingi*, 23.viii. 1948, 1 ♀ paratype, N. C. E. Miller.





Figs. 305, 306. *Stylidia scissa rhodesiensis* (Theodor). 305. female abdomen, dorsal; 306. male sternite 5 and genital area.

NYASALAND

OTHER MATERIAL EXAMINED

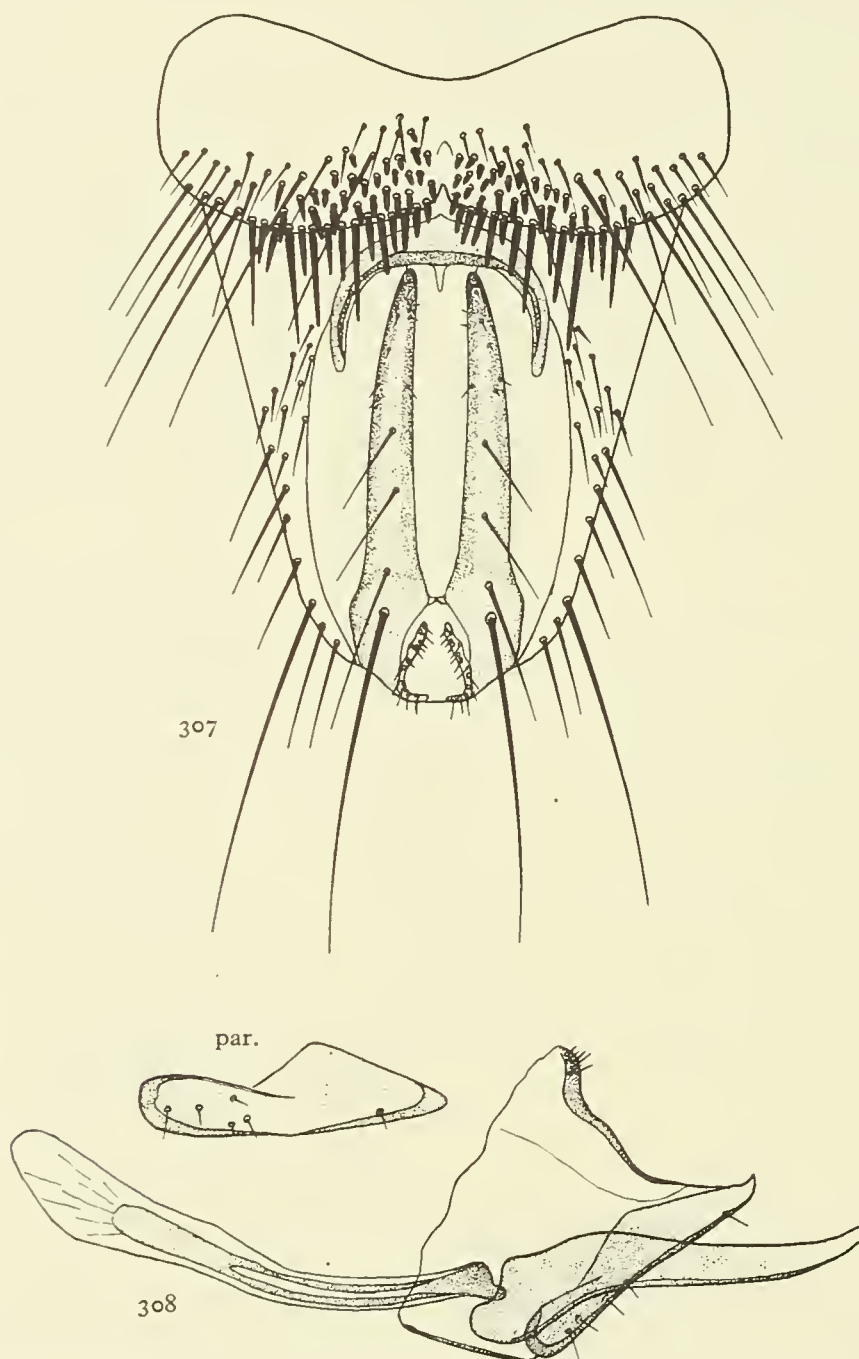
Chikinje, Ruo, 1 ♂ paratype, Wood.

***Stylidia scissa sudanica* (Theodor, 1957)**

(Figs. 307, 308)

*Nycteribia scissa sudanica*. Theodor, 1957, *Parasitology*, **47**, 457.

The abdominal ctenidium consists of only 36 spines. The male differs from *S. s. scissa* in the smaller number of setae on the surface of the abdominal tergites and in the group of spines on sternite 5. The posterior row consists of short spines near the indentation as in *S. s. scissa*, but the



Figs. 307, 308. *Stylidia scissa sudanica* (Theodor). Male. 307. sternite 5 and genital area; 308. genitalia.

lateral spines are very long and more numerous than in *S. s. scissa*. There are about 40 spines in each half as against about 30 in *S. s. scissa*. The shape of the parameres is different and the aedeagus is shorter. The female has more numerous short setae near the median line of tergite 2.

MATERIAL IN THE COLLECTION

ABYSSINIA

Lake Zwai, Arussi, from bat, 29.i. 1912, Jannasch & Goertz, N. C. Rothschild, ♂ holotype.

SUDAN

Lifi near Torit, from *Rhinolophus* sp. no. 1901, ♀ paratype.  
Lowki near Torit, from *Rhinolophus fumigatus*, 16.xii. 1951, J. S. Owen, 1 ♀ paratype.

OTHER MATERIAL EXAMINED

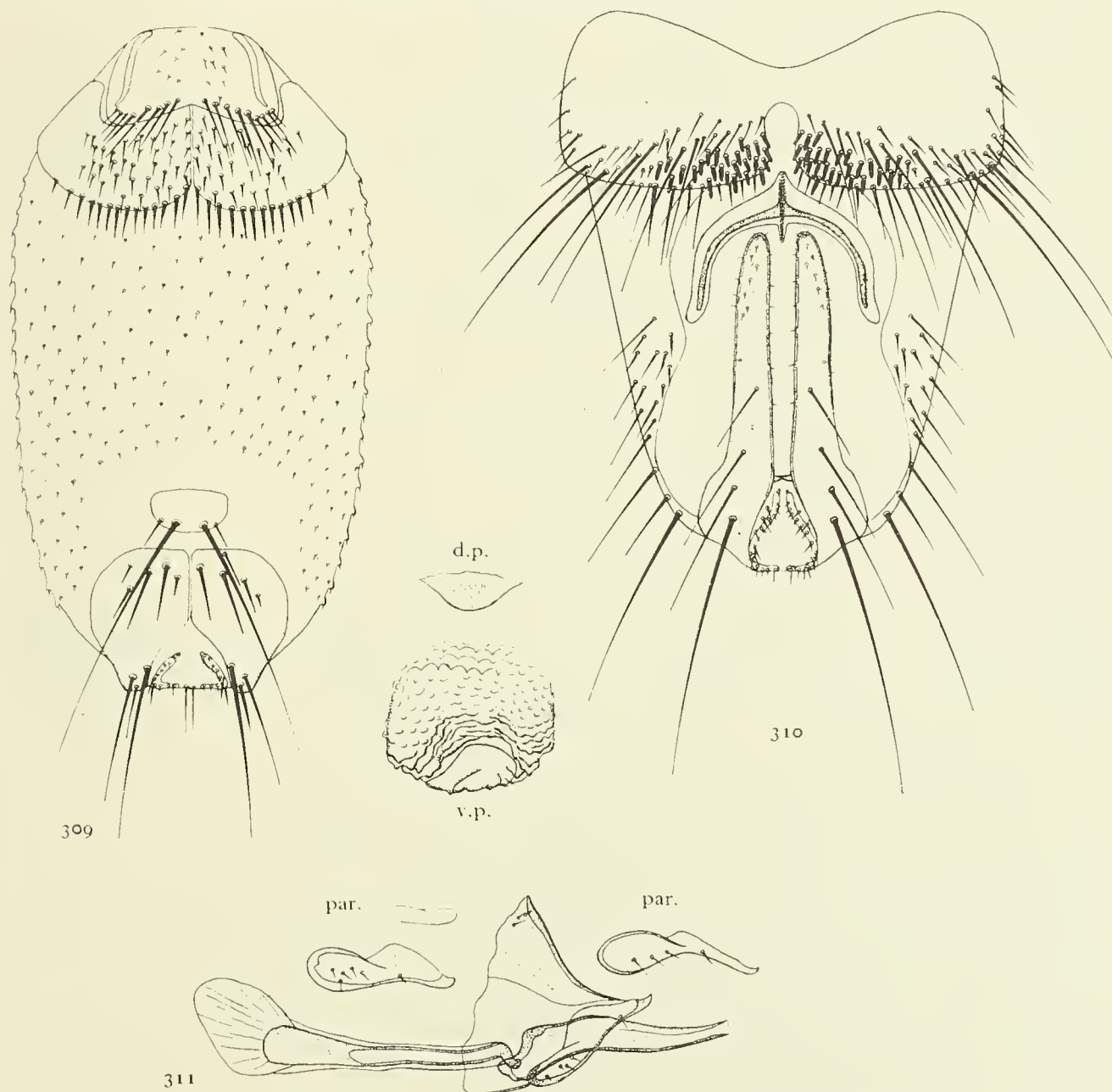
CONGO

Kibanga, Lupiala, 17.xi. 1947, 1 ♂.

**Stylidia hoogstraali** (Theodor, 1957)

(Figs. 309-311)

*Nycteribia* (*Stylidia*) *hoogstraali*. Theodor, 1957, *Parasitology*, 47, 457.



Figs. 309-311. *Stylidia hoogstraali* (Theodor). 309. female abdomen, dorsal, and genital plates; 310. male sternite 5 and genital area; 311. male genitalia and various appearances of paramere and its tip.



Length, head and thorax as in *S. s. scissa*.

*Male abdomen.* The posterior row of spines on sternite 5 consists mainly of short setae and some long, thin spines. Some very long spines, intermediate between spines and setae at the sides of the row. The median indentation of the posterior margin is much wider than in *S. s. scissa*. The spines of the anterior rows are longer than in *S. s. scissa*. The parameres are much shorter than the aedeagus and have a narrow, curved tip.

*Female abdomen.* The marginal setae of tergite 1 are longer than in *S. s. scissa* and 8–10 in number in each half. Tergite 2 has 12–13 marginal setae in each half which are also longer than in *S. s. scissa*. The whole median half or more of the surface is covered with short setae, 20–30 in each half. Tergite 6 is very small, with only 2 long setae and 2 short spines which may be absent.

Distribution: Sudan, Congo.

Type series in the Chicago Natural History Museum.

*S. hoogstraali* and the subspecies *rhodesiensis* and *sudanica* are closely related to *S. s. scissa*. The position of the two subspecies is not clear as too little material is available.

#### MATERIAL IN THE COLLECTION

##### SUDAN

Torit, Equatoria, from *Rhinolophus eloquens*, 30.viii. 1950, J. S. Owen, 1 ♂ 1 ♀ paratypes.

Nagishot near Torit, from *Rhinolophus* sp. no. 2082, E. T. M. Reid, 1 ♀ (Brit. Mus. 1955.594).

Nagishot near Torit, from *Rhinolophus eloquens*, 24.xii. 1950, 3 ♂ 5 ♀.

#### GENUS **BASILIA** Miranda Ribeiro, 1903

*Basilia.* Miranda Ribeiro, 1903, *Arch. Mus. Nac. Rio de Janeiro*, **12**, 175. Type species: *Basilia ferruginea* Miranda Ribeiro, 1903.

*Pseudoelytromyia.* Miranda Ribeiro, 1907, *Arch. Mus. Nac. Rio de Janeiro*, **14**, 231.

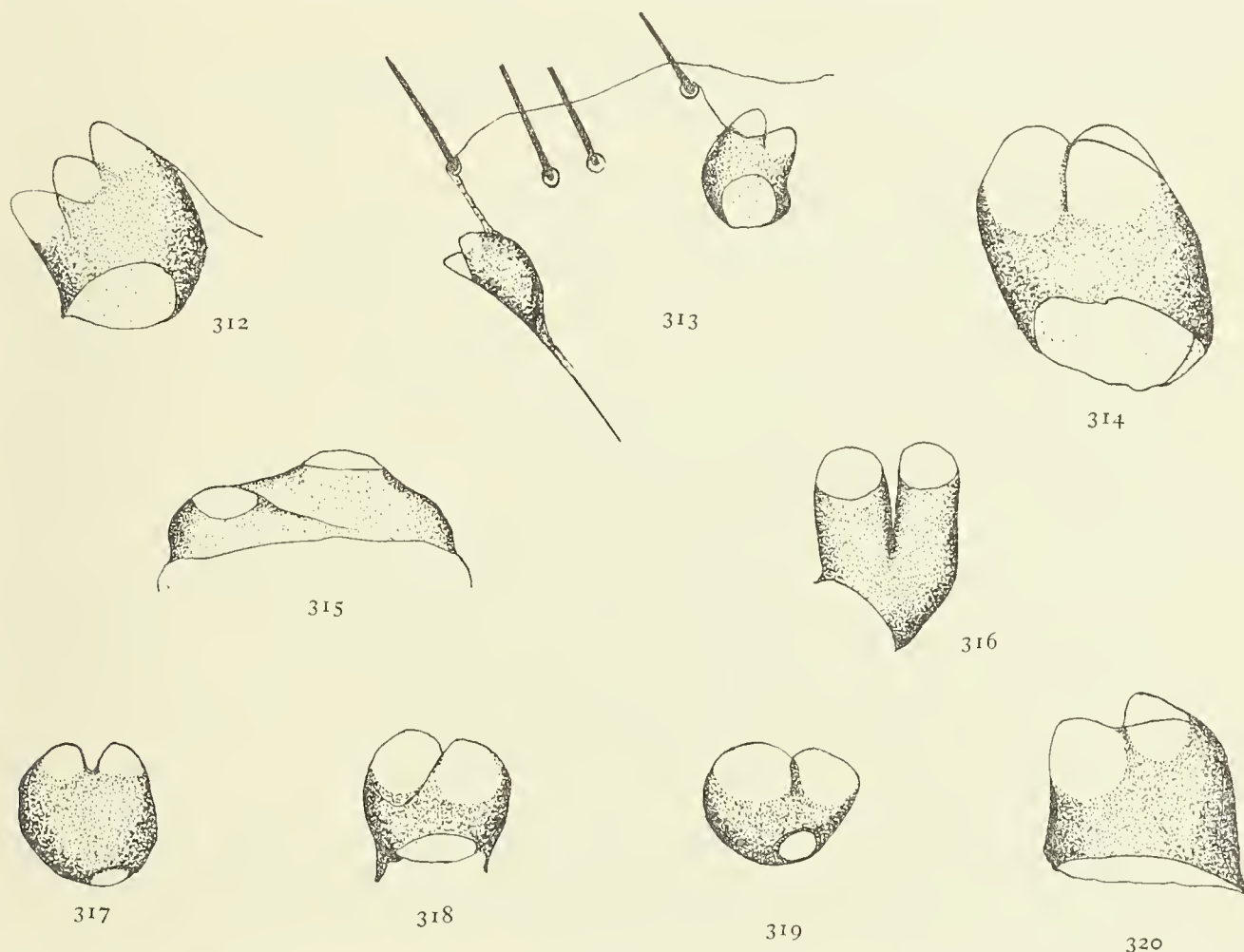
*Guimaraesia.* Schuurmans Stekhoven, 1951, *Acta Zool. Lilloana*, **12**, 101.

*Head.* Laterally compressed, either sclerotized up to the anterior margin or with a small membranous area at the anterior dorsal margin. Eyes either consisting of two incompletely separated lenses on a common pigmented base (reduced to a single lens in some species and pigmentation also reduced in some cases) or absent (Figs. 312–320). Labella of the proboscis shorter than the theca in most species, as long as, or longer in a few. Thorax of *Nycteribia* type, generally wider than long. Legs with more or less slender tibiae with long setae at the ventral edge. Tibia 2 of different form in one subgenus. Thoracic ctenidium with pointed spines. A complete row of long and short setae at the posterior margin of the sternal plate of the thorax. Haltere groove open. Post-spiracular sclerite with several setae. Abdomen of the female with 2, 3 or 4 tergital plates before the anal segment, tergital plates 2–4 may be divided into lateral sclerites. Tergite 1 may bear 2 groups of setae posteriorly. Tergal plate 2 has long posterior processes in some groups or it may have a straight or rounded posterior margin. Abdominal ctenidium well developed. Genital plate reduced to some setae on an area of minute spines in most species. Sternite 5 of the male with an armature of spines in most species. Genitalia of *Nycteribia* type.

The genus is distributed throughout the Western parts of the Palaearctic Region, the Ethiopian and Oriental Regions. It is represented in Australia and New Guinea by the subgenus *Tripselia*,

but is absent in the Pacific Region east of Australia. It is the only Old World genus which is also widely distributed in America.

Up to now, the main character of the genus was considered the possession of eyes which consisted of two lenses on a pigmented common basis. Now, however, species have been discovered with and without eyes in the same genus, or with eyes consisting of 1 and of 4 lenses in another genus. Thus, the main reason for keeping *Tripselia* as a separate genus becomes invalid as it resembles species of the *bathybothyra* group of *Basilias* closely except for the absence of eyes. *Tripselia* is therefore here considered as a subgenus of *Basilias*.



Figs. 312-320. Eyes of *Basilias* spp.: 312, 313. *B. daganiae*; 314, 320. *B. nattereri*; 315. *B. italica*; 316. *B. roylii*; 317-319. *B. nana*.

With the inclusion of *Tripselia*, *Basilias* becomes the largest genus of the family, containing about 80 species. Of these, 60 form the genus *Basilias* in its old conception and 18 belong to the subgenus *Tripselia*. The species show a great variety of form, all, however, clearly possessing the character of the genus. The wide distribution of *Basilias* and the great variety of form of its species suggests that this is one of the oldest, if not the oldest, of the genera of the family. It is of interest in this connection, that a species of *Basilias*, for which a new subgenus is proposed here (*Conotibia*), has tibia 2 of a type which was considered characteristic for the American genus *Herskovitzia*, which is clearly one of the most primitive forms of the family. According to

Guimarães, *Herskovitzia* shows most affinities with the genus *Nycteribia*, but the presence of eyes in some species of the genus and the form of tibia 2 make it probable that the genus has closer affinities with *Basilis*.

KEY TO THE SUBGENERA AND GROUPS OF *BASILIA*

1. Eyes present, consisting of two incompletely separated lenses in most species, reduced in a few species to a single lens. 2  
 Eyes absent. Tibiae long or very long and slender. Tergite 1 of the female abdomen with 2 groups of long or short setae. Tergal plate 2 with posterior processes with long setae or spines.  
**Subgenus Tripselia** (p. 300)
2. All tibiae of equal shape. 3  
 Tibia 2 different from tibiae 1 and 3, conical, with 2-3 rows of spines near the base. Femur 2 curved, basitarsi very short. Abdomen of the female with 4 tergites before the anal segment.  
**Subgenus Conotibia** (p. 284)
3. Tergite 1 and sternite 1 + 2 of the female abdomen very long, covering half the abdomen or more. Other segments and spiracles 2-7 concentrated in the posterior half or third of the abdomen. Tibiae with 3 rows of setae in the middle of the ventral edge. **Subgenus Paracyclopodia** (p. 290)  
 Tergite 1 and sternite 1 + 2 shorter than half the abdomen. Tibiae with rows of setae in the distal half of the ventral edge. 4  
(Subgenus **Basilis** (p. 199).)
4. 4 tergital plates before the anal segment of the female abdomen. Tergital plates 3 and 4 divided into lateral sclerites. Small insects. Oriental region. **eileenae group of the subgenus Basilis** (p. 217)  
 3 tergital plates before the anal segment of the female. 5  
 2 tergital plates before the anal segment of the female. 7
5. Tergal plate 2 of the female with posterior margin rounded, straight or concave. 6  
 Tergal plate 2 of the female with posterior processes which bear setae and spines.  
(Old World.) bathybothyra group of subgenus Basilis (p. 224)  
(New World.) forcipata group of subgenus Basilis (p. 257)
6. Tergal plate 3 of the female single, wider than long.  
(Old World.) nattereri group of subgenus Basilis (p. 199)  
 Tergal plate 3 of female divided into two separated lateral plates.  
(New World.) antrozoi group of subgenus Basilis (p. 254)
7. Tergal plate 2 of the female with two posterior processes which bear setae and spines. Sternite 6 undivided. (New World.) ferruginea group of subgenus Basilis (p. 259)  
 Tergal plate 2 of the female with rounded or straight posterior margin. Sternite 6 divided into lateral plates. (New World.) speiseri group of subgenus Basilis (p. 271)

KEY TO THE OLD WORLD SPECIES OF *BASILIA* (EXCLUDING SUBGENUS *TRIPSELIA*)

## MALES

1. All 3 tibiae of equal shape, with 3 or 4 rows of setae at the ventral edge. 2  
 Tibia 2 different in shape from tibiae 1 and 3, cone shaped, with 2-3 rows of spines near the base. Basitarsi very short. All tergites with bare surface, tergites 2-5 with uniform marginal rows of short setae. Sternite 5 with a double row of 14 spines. Aedeagus parallel-sided. Parameres very large, with strongly curved ventral margin and upturned tip. Phallobase with a dorsal process. Malaya, Indochina (Figs. 484-488, 491, 492). **B. (C.) compar** (p. 285)
2. Sternite 5 with a group of spines at the posterior margin. 3  
 Sternite 5 without a group of spines at the posterior margin, the marginal row consisting of setae only. Tergites 2-6 with hairs on the surface. Aedeagus tapering, with upturned mem-



- branous tip, ending in a fringe of scales. Parameres slipper-shaped. Thailand, Indochina (Figs. 352-355). **B. pudibunda** (p. 213)
3. Densely hairy species. All sclerites thickly covered with thin setae. Sternal plate of the thorax much wider than long. Sternite 5 with a group of 25-30 spines in 2-3 rows. Aedeagus tapering to a point, very slightly curved. Parameres with a nearly rectangular end. Malaya, Java (Figs. 324, 325). **B. hispida** (p. 199)
- Less hairy species, at least some sclerites partly bare. Hairs on the surface of the tergites concentrated in groups in the middle or forming transverse rows. 4
- Tergites 3-6 either completely bare or only with some minute spines in the lateral parts of the surface. 7
4. Larger species, 3 mm. long. 15 notopleural setae. Greater part of the surface of tergites 2-5 covered with hairs. Tergite 6 with a transverse row of setae. Sternite 5 with a row of 6-8 spines at the posterior margin. Aedeagus with upturned membranous end, forming a fringe of scales along the dorsal surface. Parameres with straight ventral edge (Figs. 347, 348). **B. nattereri** (p. 211)
- Smaller species, 2 mm. long. 9-12 notopleural setae. Tergite 6 with bare surface. 5
5. Eyes reduced, with only a single unpigmented lens. Sternite 5 with 4-6 spines at the posterior margin and setae in the middle of the row of spines. Aedeagus with a large dorsal hump, tapering to a point. Malaya (Figs. 336, 337). **B. monocula** (p. 206)
- Eyes with 2 lenses on a pigmented base. Sternite 5 with a continuous row of spines at the posterior margin. Aedeagus with rounded and serrated end and backwardly directed point. Parameres with a large ventral tooth. 6
6. Eyes spherical, strongly pigmented, with small, well-separated lenses. Europe, Near East (Figs. 317-319, 338-340). **B. nana** (p. 209)
- Eyes shallow, lenses indistinctly separated or fused and with a ring of pigmentation only around the base. Amboina, Java (Figs. 332, 333). **B. magnocula** (p. 204)
7. All tergites with completely bare surface (except tergite 2 in some cases). Tergites 2-5 with uniform marginal rows of short setae. Tergite 6 with some longer setae in the marginal row. Sternite 5 with a group of about 25 long spines occupying nearly the whole width of the posterior margin. Aedeagus short and wide, with rounded end. Small species, 1.8-2 mm. long. 8
- Long setae present in the marginal row of tergites 3-6 or 4-6. 10
8. Length 2 mm. Spines of the abdominal ctenidium very long (0.12 mm.). Thailand, Java (Figs. 367, 368). **B. pectinata** (p. 221)
- Spines of the abdominal ctenidium shorter, 0.07 mm. 9
9. Length 1.8 mm. A few small spines on tergite 2. Tergite 6 nearly twice as long as tergite 5, rounded posteriorly, with 6 long vertical setae in the middle of the marginal row. Borneo (Figs. 358, 359). **B. borneensis** (p. 217)
- Length 1.5-1.7 mm. Tergite 2 bare. Tergite 6 with straight posterior margin and some moderately long setae in the marginal row. Ceylon (Figs. 362-364). **B. eileenae** (p. 219)
10. Tibiae with curved ends, with 3 or 4 rows of long setae which reach beyond the end of the tibia in the distal half of the ventral edge. 11
- Tibiae with tapering ends, slender, with 3 rows of shorter setae in the middle of the ventral edge. The setae do not reach beyond the end of the tibia. Aedeagus slightly curved, tapering to a point and with a sharp bend near the base (Subgenus **Paracyclopodia**.) 13
11. Tergites 3-6 with surface nearly completely bare. 12
- Tergites 3-6 with more or less numerous short spines on the lateral parts of the surface. 16
12. Spines of the abdominal ctenidium very long and thin, 10 times as long as wide, 0.12 mm. long. Sternite 5 with a group of about 20 spines in 2 rows in the middle of the posterior margin. Aedeagus tapering to a point. Congo (Figs. 408-410). **B. tenuispina** (p. 273)

- Spines of the abdominal ctenidium shorter and thicker, 0.09 mm. long. Sternite 5 with a group of 35 spines in 2 rows. Aedeagus short and thick, with a rounded end and a small ventral tooth. Europe (Figs. 315, 328, 329). **B. italica** (p. 202)
13. Length 2 mm. Tergites 2-6 completely bare on the surface, except for a few scattered minute spines. Sternite 5 with a group of 10-12 short spines in a double row. Madagascar (Figs. 503-505). **B. (P.) madagascarensis** (p. 294)
- Larger species, 2.5-3 mm. **14**
14. Tergite 2 with a few scattered spines on the surface. Sternite 4 with a marginal row of short spines laterally and some short setae in the middle. Sternite 5 with a group of about 15 spines in a double row. Aedeagus 0.2 mm. long. Oriental Region. Southern Palaearctic parts of East Asia (Figs. 508, 509). **B. (P.) roylii** (p. 296)
- Tergite 2 with a few short hairs at the sides of the surface. Sternite 4 with a marginal row of setae. **15**
15. Length 3 mm. Sternite 5 with a group of about 20 spines in a double row on a median bulge of the posterior margin. Aedeagus 0.4 mm. long. Parameres straight, with pointed end. Congo (Figs. 499, 500). **B. (P.) glabra** (p. 294)
- Length 2.5 mm. Sternite 5 with a straight posterior margin and a group of 12-14 spines in a double row. Aedeagus 0.25 mm. long. Parameres with curved ventral edge and rounded tip. Africa (Figs. 496, 498). **B. (P.) bouvieri** (p. 290)
16. Very long setae on tergites 3-6. Africa, Middle East. **17**
- Very long setae only on tergites 4-6. Oriental region. **19**
17. Small species, 2 mm. long. Tergite 2 triangularly produced posteriorly, with a group of 8-10 closely placed long setae in the middle. Parameres with curved apical end (Figs. 372-374). **B. ansifera** (p. 226)
- Larger species, 2.5 mm. long. Tergite 2 uniformly rounded posteriorly with a row of setae of about equal length. **18**
18. Anal segment longer than the 3 preceding tergites, longer than wide at the base. Sternite 5 with a double row of about 25 spines. Aedeagus straight, tapering to a blunt point. Parameres with truncate end. Africa (Figs. 399-401). **B. robusta** (p. 241)
- Anal segment shorter, as long as the two preceding tergites, as long as wide at the base. Sternite 5 with a group of about 15 spines in a double row. Aedeagus curved, tapering to a point. Middle East, Kenya (Figs. 375-379). **B. daganiae** (p. 228)
19. Tergite 2 with rounded posterior margin and a uniform marginal row of moderately long setae. **20**
- Tergite 2 triangularly produced posteriorly and with long setae in the middle of the marginal row. **21**
20. Small species, 1.8 mm. long. Tergite 2 very short, with nearly straight posterior margin and with a uniform marginal row of moderately long setae, like those on tergite 3. Sternite 5 with a row of 8-9 spines. Aedeagus tapering to a point, 0.18 mm. long. India, Ceylon (Figs. 393-395). **B. pumila** (p. 237)
- Larger species, 2.5 mm. long. Tergite 2 longer, more strongly rounded posteriorly. The setae of the marginal row are slightly longer in the middle. Sternite 5 with a row of 9-12 spines at the posterior margin. India (Figs. 384-386). **B. fletcheri** (p. 231)
21. Posterior margin of tergite 2 with 6-8 setae in the middle which are about as long as tergites 3 and 4 together. Only 8-12 minute spines at the sides of the surface of tergites 3-5. Tergite 6 with few or none. Oriental Region from Ceylon to the Philippines (Figs. 388-390). **B. majuscula** (p. 233)
- Posterior margin of tergite 2 more strongly produced in the middle, with 4-6 very long setae which reach to the hind margin of tergite 5. Lateral thirds of tergites 3-6 covered with minute, strong spines. India, Ceylon (Fig. 397). **B. punctata** (p. 239)

The males of *B. afghanica*, *B. meridionalis*, *B. seminuda* are unknown



## FEMALES

1. All 3 tibiae of the same shape, with 3 or 4 rows of setae at the ventral edge. 2  
 Tibia 2 different in shape from tibiae 1 and 3, cone-shaped, with 2-3 rows of spines near the base. Basitarsi very short. Tergal plate 2 short, surface bare, undivided. Two elliptical tergites with long setae posteriorly before the anal segment. Anal segment narrow, parallel-sided, with long setae posteriorly. Malaya, Indochina (Figs. 484-490). B. (C.) compar (p. 285)
2. Tergite 1 and sternite 1 + 2 very long, covering half the abdomen or more. Posterior tergites and sternites strongly modified, concentrated in the posterior half or third of the abdomen. Tibiae slender, with 3 rows of setae in the middle of the ventral edge. Lateral sclerites present on sternites 3 and 4. 3  
 (Subgenus **Paracyclopodia**.)  
 Tergite 1 and sternite 1 + 2 normal, short. Sternites 3 and 4 membranous, without lateral sclerites. 5
3. Tergite 1 and sternite 1 + 2 about as long as half the abdomen. Tergite 1 with curved sides and widely separated posterior processes which bear 4-5 long setae. Tergal plate 2 W-shaped. Abdominal ctenidium reaching to the lateral corners of the sternite. Africa (Figs. 494, 495). B. (P.) bouvieri (p. 290)  
 Tergite 1 and sternite 1 + 2 covering two-thirds of the abdomen. Abdominal ctenidium not reaching to the lateral corners of the sternite. 4
4. Length 2.5-3 mm. Oriental Region and southern parts of Palaearctic East Asia (Figs. 506, 507). B. (P.) roylii (p. 296)  
 Length 2 mm. Madagascar. B. (P.) madagascarensis (p. 294)
5. Tergal plate 2 either straight, rounded or angularly indented posteriorly. 6  
 Tergal plate 2 with 2 posterior processes which bear long setae. (bathybothyra group) 15
6. Only one tergal plate (which may be divided into lateral sclerites) between tergal plate 2 and the anal segment. (nattereri group.) 7  
 Two tergal plates each consisting of 2 lateral sclerites, between tergal plate 2 and the anal segment. (eileenæ group.) 13
7. Tergal plate 2 with heavily sclerotized posterior lateral corners. 8  
 Tergal plate 2 without such corners, rounded posteriorly. 12
8. Posterior margin of tergal plate 2 angularly indented, with a rudimentary median division line. Sclerotized lateral corners well developed, with a group of long setae on a process. A few setae and spines in the middle of the posterior margin. Tergal plate 3 divided into lateral sclerites Thailand, Indochina (Figs. 349-351). B. pudibunda (p. 213)  
 Posterior margin of tergal plate 2 either straight or rounded. 9
9. Tergal plate 2 rectangular or square, with straight posterior margin. 10  
 Tergal plate 2 rounded laterally and/or posteriorly. 11
10. Length 3 mm. 15 notopleural setae. Tergal plate 2 transversely rectangular, much wider than long, covered with short hairs in its greater part. Sternite 6 divided into 2 lateral sclerites. Europe (Figs. 344-346). B. nattereri (p. 211)  
 Length 2 mm. 9-12 notopleural setae. Tergal plate 2 square, with a diamond-shaped field of hairs in the middle. Sternite 6 divided into 3 sclerites. Europe, Near East (Figs. 341-343). B. nana (p. 209)
11. Tergal plate 1 with about 15 long, thin setae and a concavity in the middle of the posterior margin. Tergite 2 rounded anteriorly and laterally and with a straight posterior margin. Spiracle 2 lies outside the sclerite. No setae at the lateral margin anterior to the sclerotized posterior corners. 2-3 rows of short hairs along the median division line. Tergal plate 3 with 6 setae posteriorly, as wide as the anal segment. Moluccas, Java (Figs. 330, 331). B. magnocula (p. 204)  
 Eyes rudimentary, consisting of an unpigmented ocellus. Tergite 1 with only 6 setae at the posterior margin which has no concavity in the middle. Tergal plate 2 rounded posteriorly, spiracle



2 lies inside the sclerite. Several setae at the lateral margin of the sclerite anterior to the weakly sclerotized posterior lateral corners. Many short hairs on the surface. Tergal plate 3 very narrow, about half as wide as the anal segment, with 4 setae posteriorly. Malaya (Figs. 334, 335).

**B. monocula** (p. 206)

12. Tergite 1 with two groups of setae at the sides of the posterior margin. Tergal plate 2 trapezoidal, narrower posteriorly, with a row of setae at the posterior margin which has a small indentation in the middle. Short hairs on the surface in the anterior lateral corners and along the median division line. Anal segment with two long styles with long setae at the end. (Figs. 326, 327).

**B. italica** (p. 202)

The whole abdomen densely hairy. Tergite 1 with a marginal row without a gap in the middle. Tergal plate 2 short, about as long as the width of tergite 1, rounded posteriorly, with a continuous dense row of setae. The whole surface is covered with short hairs. Connexivum between tergal plates 2 and 3 covered with hairs laterally, bare in the middle. Tergal plate 3 elliptical, with setae posteriorly and short hairs on the surface. Anal segment conical, without styles. Malaya, Java (Figs. 321-323).

**B. hispida** (p. 199)

13. Tergal plate 2 heart-shaped, rounded posteriorly. Spines of the abdominal ctenidium very long, 0.15 mm., about half as long as the sternite. Thailand, Java (Figs. 365, 366). **B. pectinata** (p. 221)  
Spines of the abdominal ctenidium much shorter, about a quarter of the length of the sternite. **14**

14. Tergal plate 2 much wider than long, with bare surface, and 4-6 widely spaced, moderately long setae at the posterior margin. Ceylon (Figs. 360, 361). **B. eileenae** (p. 219)

Tergal plate 2 nearly as long as wide; length to width = 7:9. A few short hairs on the surface and 6 long setae in the middle of the posterior margin. Borneo (Figs. 356, 357). **B. borneensis** (p. 217)

15. Tergal plate 3 divided into lateral sclerites. **16**  
Tergal plate 3 undivided, with posterior processes or not. **17**

16. Setae at the posterior margin of tergite 1 shorter than the tergite. Sclerites of tergal plate 3 elliptical with long setae posteriorly, lying close together. Connexivum between tergal plates 2 and 3 with several rows of setae. Genital plate with 2 long setae in the middle. India (Figs. 382, 383). **B. fletcheri** (p. 231)

Setae at the posterior margin of tergite 1 longer than the tergite. Lateral sclerites of tergal plate 3 widely separated, lying far posteriorly. Connexivum between tergal plates 2 and 3 bare. Genital plate semicircular, with about 12 setae. N.W. Himalayas (Figs. 402-407). **B. seminuda** (p. 243)

17. 3-4 short, thick setae in each group on tergite 1, markedly shorter than the tergite, about one-third of the length of the long setae of tergal plate 2. Anal sclerite with 8-10 setae. Africa (Fig. 391). **B. meridionalis** (p. 236)

Setae on tergite 1 as long as the tergite or longer. **18**

18. Small species, 1.5-2 mm. **19**  
Larger species, 2.5-3 mm. **20**

19. Setae on tergite 1 thin, as long as the tergite. Spines of the abdominal ctenidium short, 0.09 mm. Anal segment short, cylindrical. India, Ceylon (Fig. 392). **B. pumila** (p. 237)

Setae on tergite 1 thick and long, much longer than the tergite. Spines of the abdominal ctenidium longer, 0.12 mm. Anal segment conical, longer than wide at the base. Africa (Fig. 371).

**B. ansifera** (p. 226)

20. Tergite 1 with two widely separated groups of 3-4 thin setae which are directed outwards and are nearly as long as the sclerite. They are less than half as long as those of tergal plate 2. Anal segment long, conical, bare in its basal two-thirds. India, Ceylon (Fig. 396). **B. punctata** (p. 239)  
Setae on tergite 1 much longer than the tergite. **21**

21. Tergite 1 with 2 groups of 5-6 long setae, nearly as long as those on the posterior processes of tergal plate 2. 3-4 rows of long, thick spines anterior to the setae at the posterior processes of tergal plate 2.

- Tergal plate 3 undivided, small, elliptical, with 2 long spines posteriorly. Afghanistan (Figs. 369, 370). **B. afghanica** (p. 224)
- Tergal plate 3 larger, with 2 posterior processes which bear spines and setae. 22
22. Anal segment short, wider than long, slightly conical. Anal sclerite absent or reduced to 1-2 isolated setae. Near East (Figs. 380, 381). **B. daganiae** (p. 228)
- Anal segment longer than wide, anal sclerite well developed. 23
23. Tergite 1 with 2 groups of 3-4 setae, average 8 setae in both groups together. 3-4 long setae on the posterior processes of tergal plate 2. Spines of the abdominal ctenidium 0.09-0.1 mm. long. Oriental region. (Fig. 387) **B. majuscula** (p. 233)
- Tergite 1 with 2 groups of 4-6 setae, average 11 setae in both groups together. Spines of the abdominal ctenidium 0.12 mm. long. 4-5 long setae on the posterior processes of tergal plate 2. Africa (Fig. 398). **B. robusta** (p. 241)
- The females of *B. glabra* and *B. tenuispina* are unknown.

SUBGENUS **BASILIA** Miranda Ribeiro, 1903**NATTERERI** GROUP**Basilia hispida** n.sp.

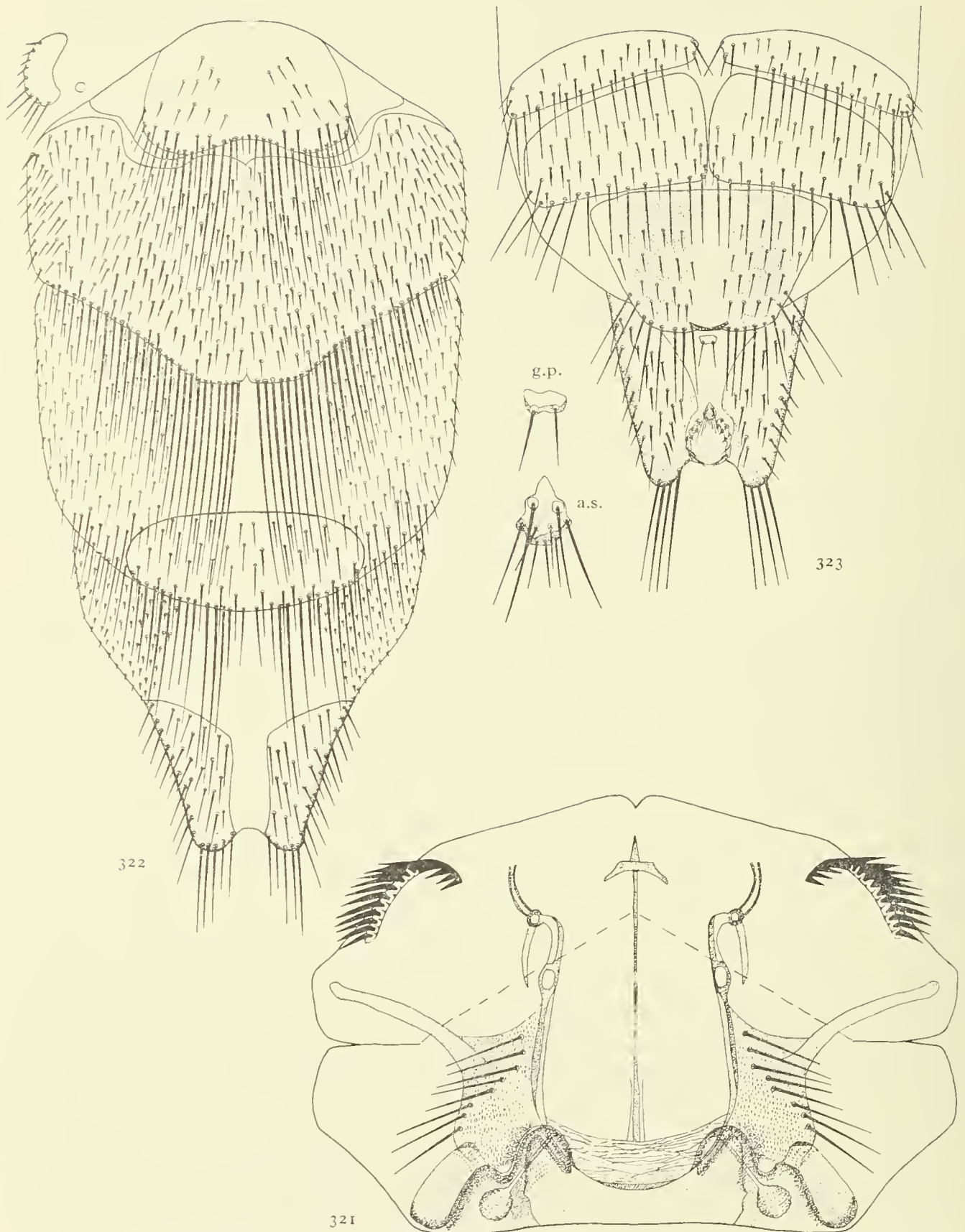
(Figs. 321-325)

Length 2.5-3 mm. Colour brown.

**Head.** Long, sclerotized up to the anterior dorsal margin, with 3-4 dense rows of setae between the eyes. Eyes with 2, sometimes 3 lenses of unequal size on a long, pigmented base. Genae covered with numerous short hairs. Labella of the proboscis half the length of the theca. Palps broad, tapering, flattened dorso-ventrally, with a marginal row of short setae and 1 or 2 long terminal setae.

**Thorax.** Much wider than long. Width to length = 8 : 5. Sternal plate nearly rectangular, angle of the oblique sutures 120°. Posterior margin of the sternal plate with a row of short setae and 3 longer setae laterally. Mesonotum wide, rounded posteriorly, with wide lateral plates of the notopleural sutures and 7-9 notopleural setae. Legs short. Tibiae 4 times as long as wide, with tapering ends and 4 rows of setae in the distal half of the ventral edge.

**Male abdomen.** Post-spiracular sclerite broad, with 3-4 setae near the spiracle and 3-5 short spines. Tergite 1 with a marginal row of moderately long, thin setae laterally and some more widely spaced short hairs towards the middle. There is a gap in the middle of the row. Tergites 2 and 3 with dense marginal rows of thin setae. Surface covered with short hairs. Tergites 4-6 with marginal rows of setae which are much longer and stronger in the middle. A gap in the middle of the marginal row of tergite 6. Tergites 4 and 5 with short hairs on the surface, but only a premarginal row on tergite 6 in the middle and several rows laterally. Anal segment broad, conical, with short hairs on the lateral parts of the dorsal surface and longer setae posteriorly. Sternite 1 + 2 with a ctenidium of 65-70 spines. Sternites 3 and 4 short, with uniform marginal rows of short setae. Surface covered with short hairs. Sternite 5 much longer, rounded posteriorly. A group of 25-30 spines in 2-3 rows at the posterior margin. The group forms a shallow triangle with the apex anteriorly. All spines are of about the same length; long setae

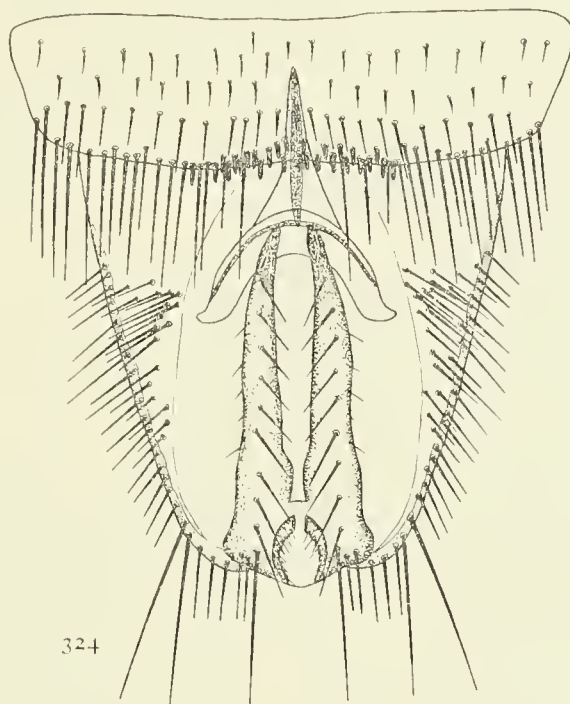


Figs. 321-323. *Basilia hispida* n.sp. 321. thorax, dorsal; 322. female abdomen, dorsal; 323. same, ventral, posterior part, with genital plate and anal sclerite.



present laterally to the group of spines. The surface of the sternite is covered with short setae. Anal segment thickly covered with setae at the sides of the ventral surface.

*Genitalia.* Basal arc triangular, with a long, narrow, anterior process. Claspers dark, slightly curved, with several rows of setae on the dorsal surface which are longer basally. Phallobase concave dorsally, with 2 setae near the base and 2 near the apical end. Aedeagus almost straight, slender, tapering to a sharp point, with a dorsal membrane. Apodeme long, with a broad end



324



325

Figs. 324, 325. *Basilia hispida* n.sp. Male. 324. sternite 5 and genital area; 325. genitalia.

plate. Parameres nearly rectangular, with a row of minute hairs near the tip and a few along the ventral edge.

*Female abdomen.* Post-spiracular sclerite with longer and more setae than in the male. Tergite 1 rounded posteriorly, with a continuous marginal row of long, thin setae. Tergal plate 2 broader than long, roughly heart-shaped, with rounded posterior margin, divided in the middle. Long setae posteriorly and shorter setae at the oblique lateral margins. Surface densely covered with short hairs. Tergal plate 3 transversely elliptical, with long setae posteriorly and shorter setae on

the surface. The rows of setae continue laterally on the pleurae. Dorsum of abdomen and the pleurae covered with very short spines, except for a median stripe. Anal segment short, conical, the lateral sclerites thickly covered with short setae. Sternite 1 + 2 as in the male, but longer and with a ctenidium of 80 spines. Sternites 3 and 4 with uniform marginal rows of short setae and about 10 rows of short hairs on sternite 3; only 2-4 rows on sternite 4. A premarginal row of 6 vertical setae on sternite 3. Sternite 5 with elliptical lateral sclerites with longer setae laterally and shorter setae at the median part of the hind margin and on the surface. Sternite 6 with two rectangular sclerites which reach the midline. Chaetotaxy as on sternite 5. Sternite 7 trapezoidal, with longer setae posteriorly at the sides and short setae on the surface except in a median bare strip. Anal sclerite irregularly elliptical with 4 long and several shorter setae. Genital plate small, with 2 setae.

Distribution: Malaya, Java.

MALAYA. Selangor, from *Tylonycteris* sp., 21.i. 1954, ♂ holotype, 4 ♂ and ♀ paratypes. U.S. National Museum. Same data, 16.xi. 1953, 1 ♂ paratype, B-30089.

Selangor, from *Myotis* sp., 31.viii. 1953, 3 ♀ paratypes, B-30074-75.

Pahang Road near Kuala Lumpur, 21.iv. 1949, 1 ♂ 1 ♀, B-4264; 31.vii. 1948, RTB-8250, R. Traub, 1 ♂ 1 ♀ paratypes.

Ulu Langat, from *Murina suilla*, 1.vi. 1951, R. Traub, 1 ♂ 2 ♀ paratypes, RTB-8852.

#### MATERIAL IN THE COLLECTION

##### JAVA

Bogor (Buitenzorg), from *Tylonycteris pachypus*, W. E. Balston & G. C. Shortridge, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).  
West Java, from *Pipistrellus javanicus javanicus*, G. C. Shortridge, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

##### MALAYA

Selangor, from *Tylonycteris pachypus*, 27.ii. 1962, Lord Cranbrook, 1 ♀ paratype.  
Selangor, from *Tylonycteris robustula*, 28.ii. 1962, Lord Cranbrook, 2 ♂ 1 ♀ paratypes.

#### HOST SYNONYMY

Name on original label  
*Pipistrellus tralatitius* Thomas.

Current name  
*P. javanicus javanicus* Gray.

### ***Basilica italica*** Theodor, 1954

(Figs. 315, 326-329)

*Basilica italica*. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 30.

*Basilica italica* Theodor. Aellen, 1955, *Bull. Soc. Neuchâtel Sci.* 78, 81. (Description of male.)

Length 2.5 mm.

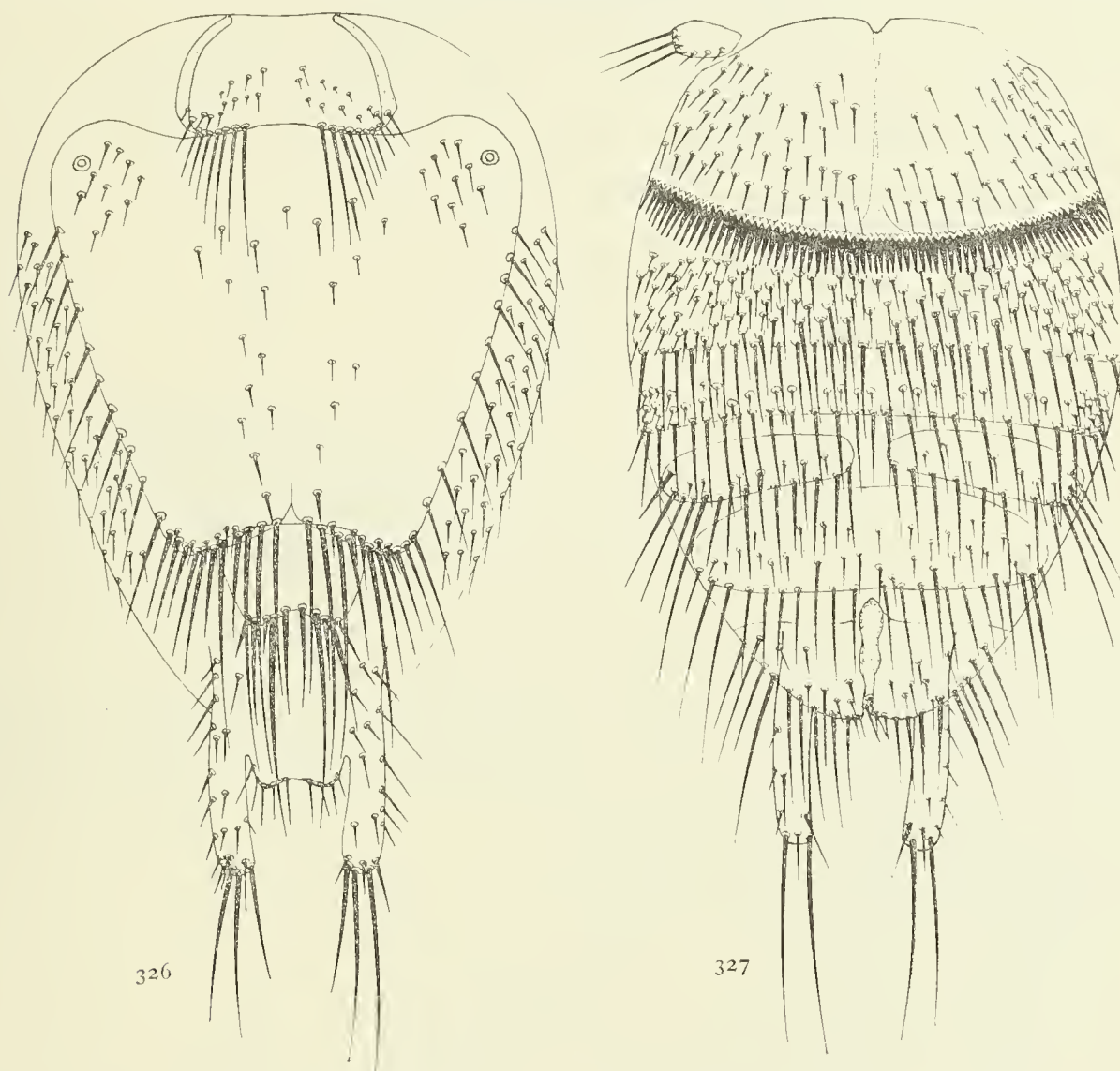
*Head*. 6 setae at the anterior dorsal margin. Eyes with wide basal opening of the ocular sclerite. Labella of the proboscis about a third of the length of the theca.

*Thorax*. Wider than long, similar to that of *B. nana*. 8-11 notopleural setae. Tibiae 3.5 times as long as wide. Angle of the oblique sutures 90°.

*Male abdomen*. Tergite 1 with a marginal row of short setae with a wide gap in the middle. Tergites 2 and 3 with marginal rows of moderately long and shorter setae, tergites 4-6 with longer setae in the middle of the marginal rows and a gap in the middle of the marginal rows of tergites 5 and 6. Several rows of short hairs on the surface of tergite 2. Tergites 3-6 bare.

Abdominal ctenidium with about 70 spines. Sternite 5 with a group of about 30 spines in 2 rows, those of the posterior row longer.

*Genitalia.* Claspers straight, with dark ends. Basal arc broad, with short anterior process and wide lateral plates. Aedeagus short and wide, nearly parallel-sided, with a small ventral tooth near the end and with a dorsal membrane which is covered with small spines. Parameres

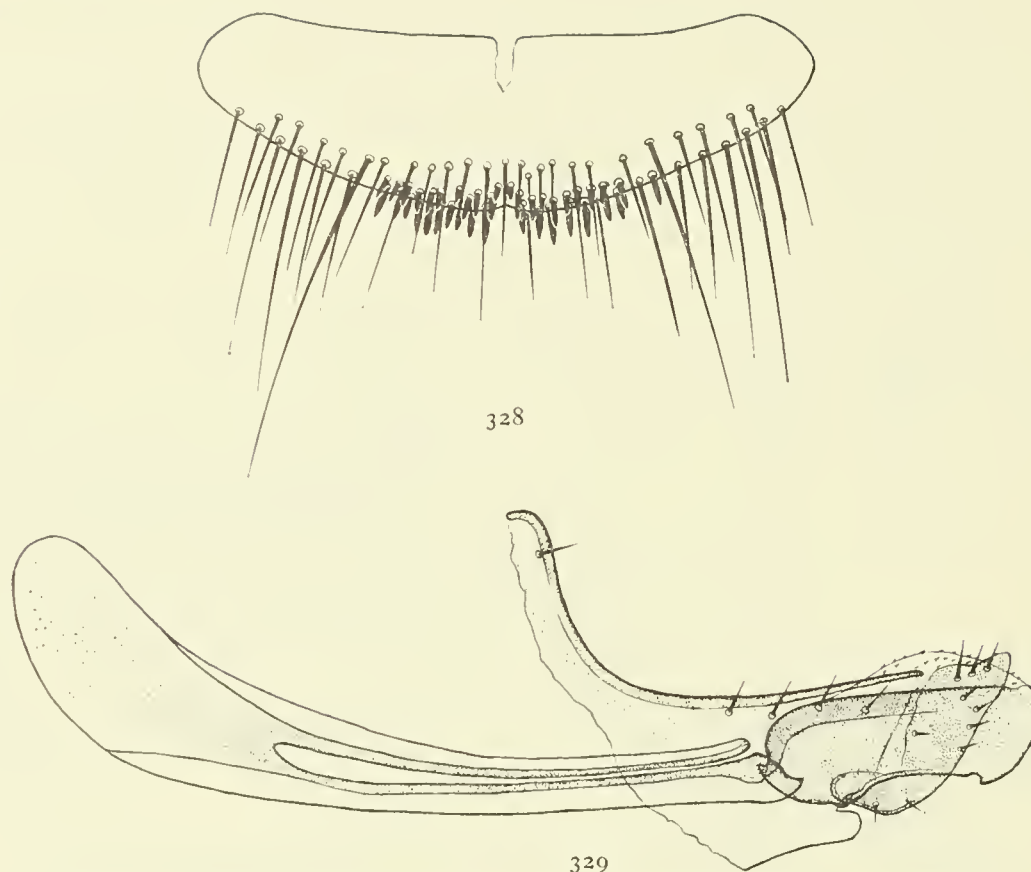


Figs. 326, 327. *Basilia italica* Theodor. Female. 326. abdomen, dorsal; 327. same, ventral.

short, triangular. This is the only Old World species with an aedeagus resembling that of some American species.

*Female abdomen.* Tergite 1 as in the male, but the setae of the marginal row are longer. Tergal plate 2 large, trapezoidal, incompletely divided in the middle, narrower posteriorly, with a dense row of longer and shorter setae at the posterior margin and a row of more widely spaced setae at the lateral margins. A double row of short hairs along the sides of the median line and some in the anterior lateral corners of the surface. Tergal plate 3 small, nearly rectangular, with a dense row of setae posteriorly, of which two in the middle are very long. Anal segment with 2 long





Figs. 328, 329. *Basilia italica* Theodor. Male. 328. sternite 5; 329. genitalia.

styles resembling those of *Stylidia biarticulata*, with several long setae at the tip and some short hairs along the stem. Sternite 5 divided into elliptical lateral sclerites which reach nearly to the midline. Sternite 6 undivided. Sternite 7 longer, rounded posteriorly. Genital plate absent. Anal sclerite represented by two isolated setae.

Distribution: Italy, Switzerland, Czechoslovakia.

♀ holotype in the Department of Parasitology, Hebrew University, Jerusalem.

#### MATERIAL IN THE COLLECTION

##### ITALY

Toscana, from *Myotis mystacinus*, 1915, N. Cimballi, N. C. Rothschild, 1 ♀ paratype.

#### ***Basilia magnocula* (Schuurmans Stekhoven, 1942)**

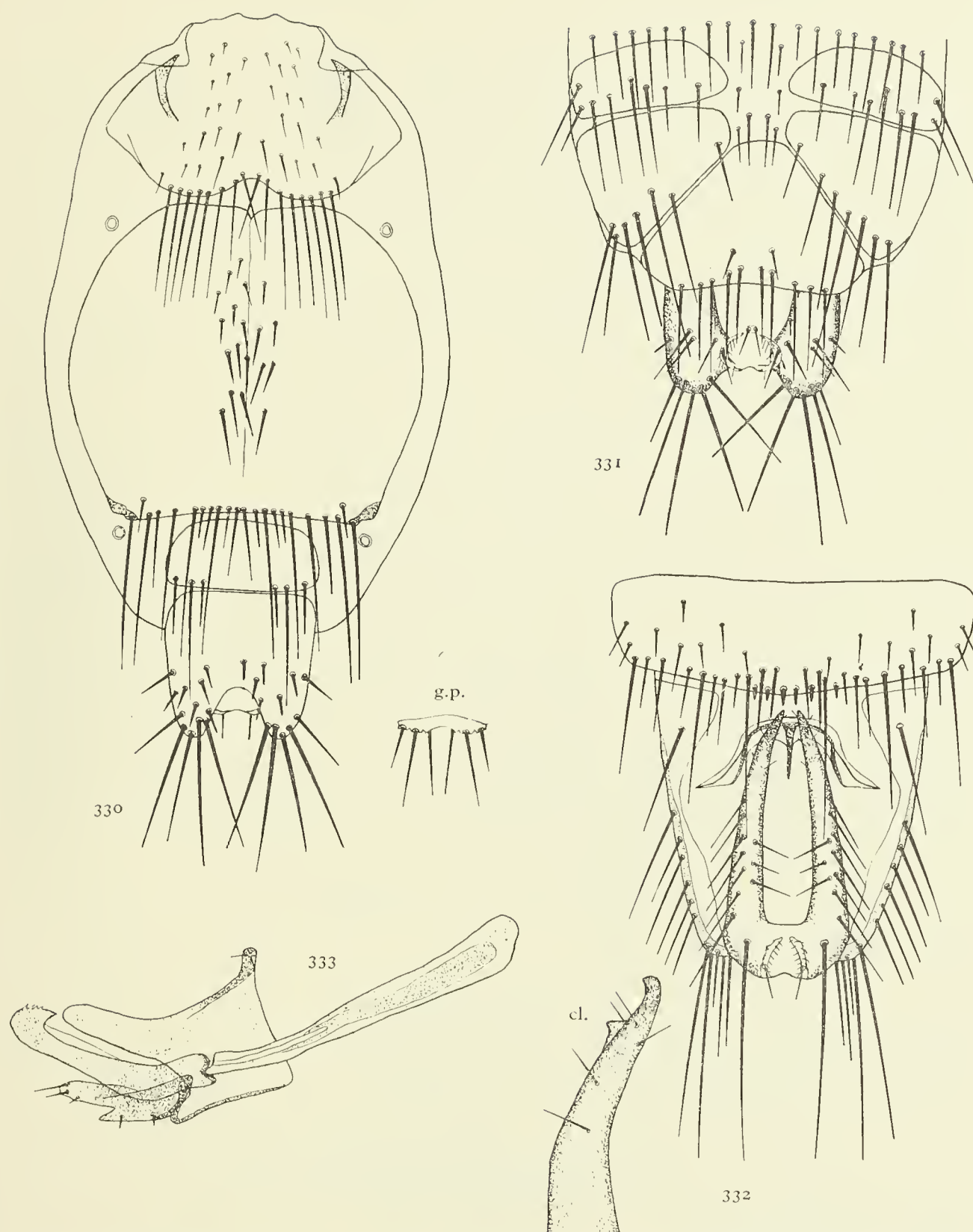
(Figs. 330-333)

*Penicillidia magnoculus*. Schuurmans Stekhoven, 1942, *Zeitschr. f. Parasitenk.* **12**, 507.

Length 1.7-2 mm. Colour light brown.

*Head*. 4 setae at the anterior dorsal margin. Eyes with either 1 or 2 lenses, sometimes 1 on one side and 2 on the other. They are shallow and pigmented only at the basal frame. Labella of the proboscis slightly shorter than the theca which is long and elliptical.

*Thorax*. Wider than long, width to length = 5 : 4, rounded anteriorly. 9-11 notopleural



Figs. 330-333. *Basilia magnocula* (Schuurmans Stekhoven). 330. female abdomen, dorsal, and genital plate; 331. same, ventral, posterior part; 332. male sternite 5 and genital area, with tip of clasper; 333. male genitalia.

setae. Angle of oblique sutures  $90^{\circ}$ . Legs short, tibiae with tapering ends, 3 times as long as wide.

*Male abdomen.* Post-spiracular sclerite slender, with 1-2 longer setae near the spiracle and 4-5 short spines. Tergite 1 with concave hind margin with a row of short setae. Groups of short hairs on the surface of tergites 2-5, tergite 6 bare. Tergites 2-6 with marginal rows of longer and shorter setae. Two long setae in the marginal rows of tergites 4-6. Anal segment conical, with short setae dorsally and longer setae posteriorly. Sternite 1 + 2 with a ctenidium of about 50 spines. Sternite 5 with a group of 4-6 short spines at the posterior margin and a pre-marginal row of setae.

*Genitalia.* Basal arc broad, with lateral flanges and a long posterior process. Claspers curved, with dark ends and a small subterminal tooth. Phallobase narrow, conical. Aedeagus curved, with rounded end and backwardly directed point. There are some serrations at the rounded tip. Apodeme long, with a narrow end plate. Parameres with a rounded tip and a long ventral tooth. The whole arrangement of the genitalia resembles that of *B. nana* closely.

*Female abdomen.* Tergite 1 with two posterior lobes each of which bears 8-10 long, thin setae. Tergal plate 2 very large, with straight posterior margin and rounded sides, indistinctly divided in the middle. There are 2-3 rows of short setae, which are longer posteriorly, along the median division line. The posterior lateral corners are strongly sclerotized. About 10 long setae and some spines at the posterior margin. Tergal plate 3 small, elliptical, with 2 long and several short setae posteriorly; surface bare. Anal segment short, parallel-sided, with 3-4 setae at the posterior processes and some short spines on the dorsal surface. Abdominal ctenidium with 55-60 spines. Sternites 5 and 6 with lateral sclerites which do not reach the midline. 3-4 setae between the sclerites. They have long setae posteriorly and short setae on the surface. The sclerites of sternite 5 are elliptical and those of sternite 6 triangular and sternite 7 is wedged in between them. It is triangular, with the apex anteriorly and has a row of long setae at the posterior margin and short setae on the surface. Anal sclerite small, rounded, with 2 long setae. Genital plate with a row of 5-6 setae on a sclerotized ridge, similar to that of *B. nana*.

#### MATERIAL IN THE COLLECTION

##### MOLUCCAS

Amboina, F. Muir, coll. no. 453, 1 ♂ 1 ♀.

#### OTHER MATERIAL EXAMINED

##### JAVA

Bogor (Buitenzorg), from *Myotis horsfieldi*, vi. 1909, Bryant & Palmer, 2 ♂ 2 ♀.

Bogor, from *Scotophilus temmincki*, vi. 1909, Bryant & Palmer, 2 ♂ 2 ♀.

#### ***Basilia monocula* n.sp.**

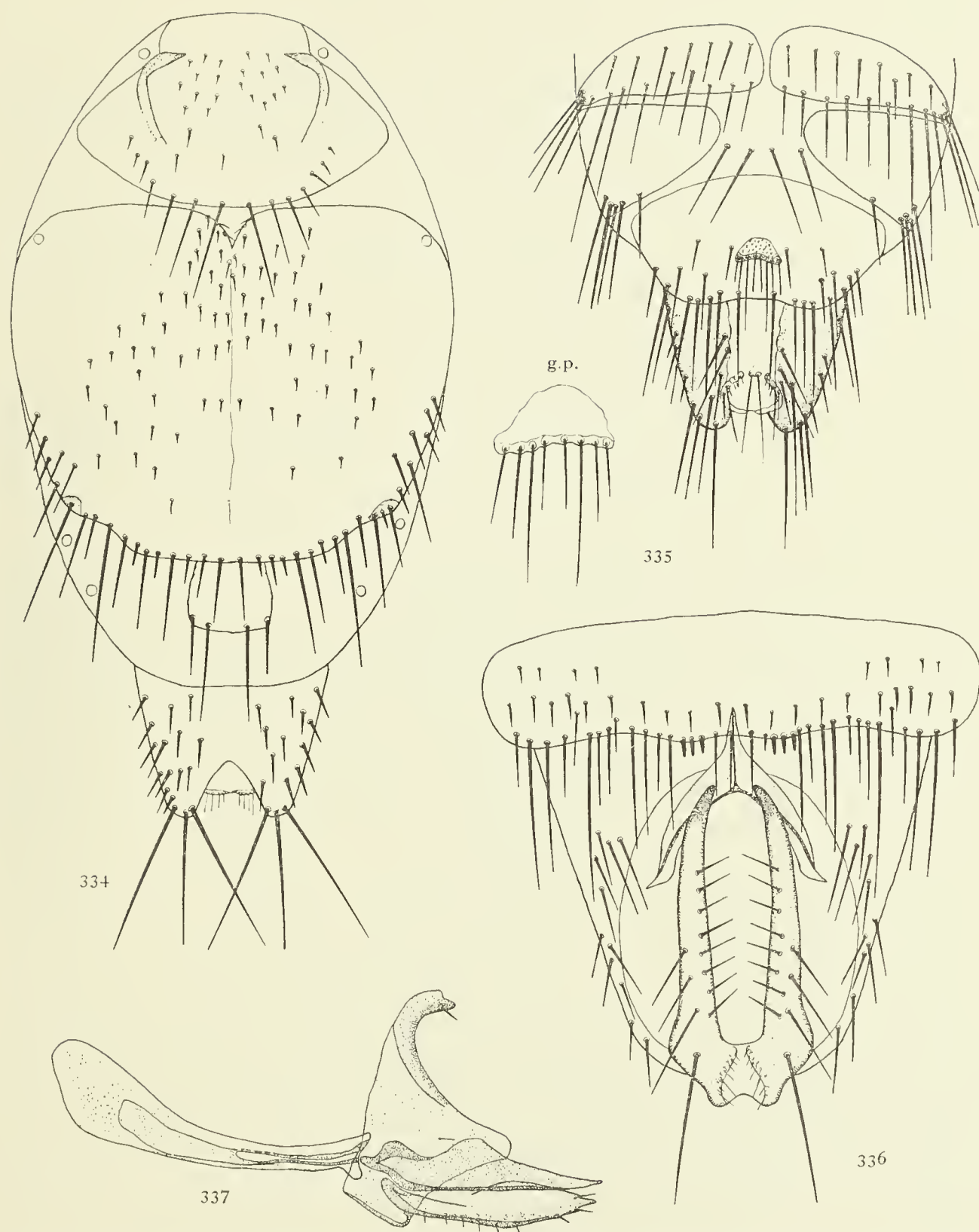
(Figs. 334-337)

Length 2 mm. Colour brown.

*Head.* 4 setae at the anterior dorsal margin. Eyes consisting of a single unpigmented lens. Labella of the proboscis as long as the theca.

*Thorax.* Slightly wider than long. Angle of oblique sutures  $90^{\circ}$ . Posterior margin of the





Figs. 334-337. *Basilia monocula* n.sp. 334. female abdomen, dorsal; 335. same, ventral, posterior part, with genital plate; 336. male sternite 5 and genital area; 337. male genitalia.

sternal plate with 2 very long setae laterally and several shorter setae. Lateral plates of the notopleural sutures wide, with 11–12 notopleural setae. Tibiae with long, tapering ends, 4 times as long as wide.

*Male abdomen.* Post-spiracular sclerite slender, straight, with a long seta near the spiracle and 4–5 spines. Tergite 1 with a uniform marginal row of short setae. Tergites 2–4 with marginal rows of moderately long and short setae and spines. Groups of short hairs on the surface. Tergites 5 and 6 convex posteriorly with 2–4 very long setae and short spines in the middle of the marginal row and some shorter setae laterally. About 15 short hairs on the surface of tergite 5, tergite 6 bare. Anal segment narrow, conical, with a deep angular concavity of the anterior dorsal margin. Sternite 1 + 2 with a ctenidium of 46 long, thin spines. Sternite 5 longer than sternite 4, with a marginal row of longer and shorter setae and 6 short spines in the middle of the posterior margin; 3 setae in the middle between the spines.

*Genitalia.* Claspers long, thin, strongly curved, with dark ends. A row of long setae in the basal half, the basal seta the longest. Basal arc triangular. Aedeagus straight, with a large dorsal hump, tapering to a sharp point. Apodeme with a broad end plate. Phallobase concave dorsally, rounded anteriorly, with 2 minute hairs near the base and 2 others further apically. Parameres nearly as long as the aedeagus, with long pointed end and several short hairs near the tip and at the ventral edge.

*Female abdomen.* Tergite 1 rounded posteriorly, with about 6 widely spaced setae in the middle of the marginal row and shorter setae and spines laterally. Tergal plate 2 very large, rounded, divided in the middle, covering the greater part of the dorsum. Spiracle 2 lies inside the sclerite. The sclerotized posterior lateral corners are small and indistinct; posterior margin with moderately long setae and spines in the middle; several setae at the lateral margin anterior to the sclerotized lateral corners; the middle of the surface is covered with short hairs which form a diamond pattern. Tergal plate 3 small, elliptical, with 2 long and 2 short setae posteriorly. Anal segment parallel-sided, longer than wide, with 4–5 long setae posteriorly at the tip of the long anal processes. Dorsal surface with short setae laterally. Sternite 1 + 2 with a ctenidium of 52 long, thin spines. Sternite 3 with a marginal row of moderately long setae and concave posterior margin. Surface thickly covered with setae, particularly laterally. Sternite 4 shorter, with a marginal row of shorter setae and only a single row of short setae on the surface. Sternite 5 with lateral triangular sclerites which reach the midline. They have short setae at the posterior margin and a long vertical seta laterally. Sternite 6 with lateral sclerites which do not reach the midline, with 3–4 vertical setae in the posterior lateral corners and 3–4 setae between the sclerites. Sternite 7 large, wedged between the sclerites of sternite 6, with a double row of vertical setae posteriorly. Anal sclerite small, rounded, with 2 setae. Genital plate with a row of 8 short, thin setae on a rounded field of minute spines.

This species resembles *B. magnocula* closely, but differs from it in the reduced eyes, in details of chaetotaxy and structure of the female abdomen and particularly in the structure of the male genitalia.

MALAYA. Selangor, Kota Tinggi, Johore, from *Pipistrellus* sp., 9.iii. 1950, R. Traub, RTB-9420, ♀ holotype, ♂ paratype, Chicago Natural History Museum.

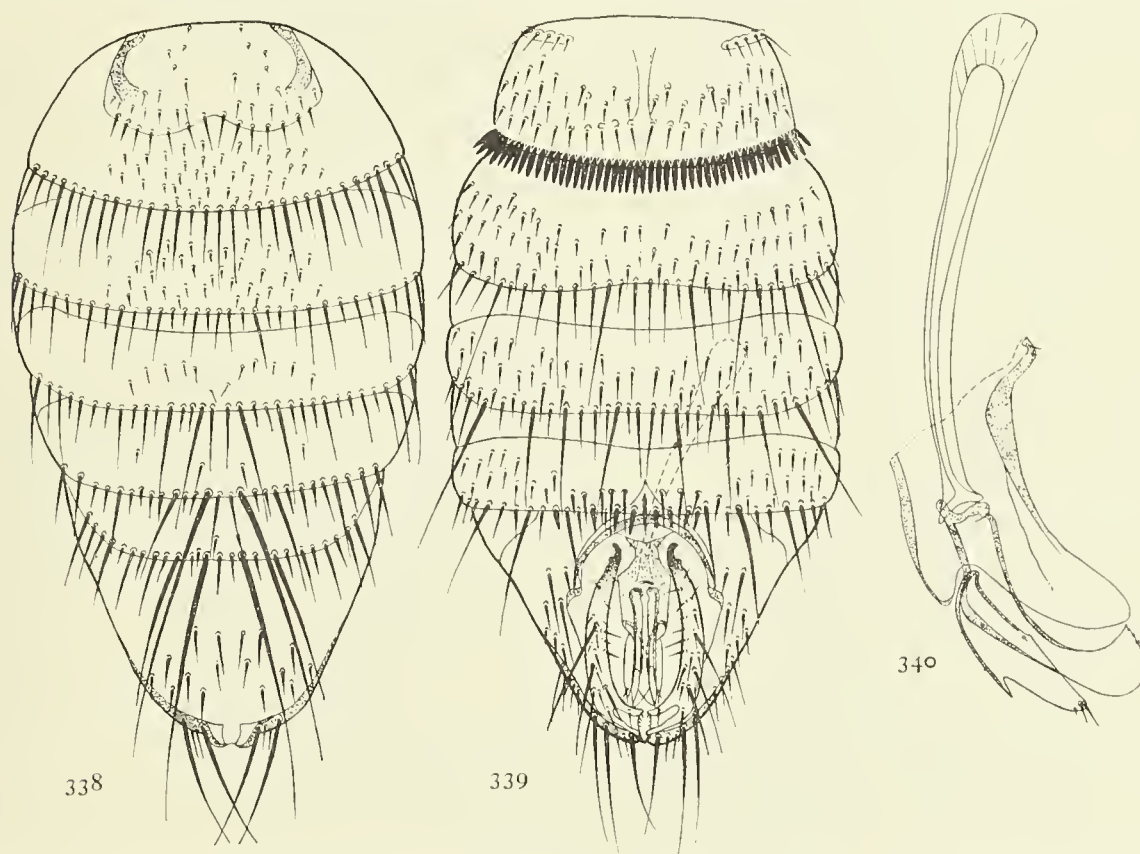
***Basilia nana* Theodor & Moscona, 1954**

(Figs. 338–343)

*Basilia nana*. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.*Penicillidia nattereri* Kolenati. Speiser, 1901, *Arch. Naturgesch.* **67**, 11 (*pro parte*).*Listropodia nattereri* Kolenati. Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117.*Basilia nana* Theodor & Moscona. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 30.

Length 1.8–2 mm. Head with 2–4 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax*. Wider than long, similar to that of *B. nattereri*, but there are only 9–12 notopleural setae which do not reach as far anteriorly as in *B. nattereri*. Legs as in *B. nattereri*.



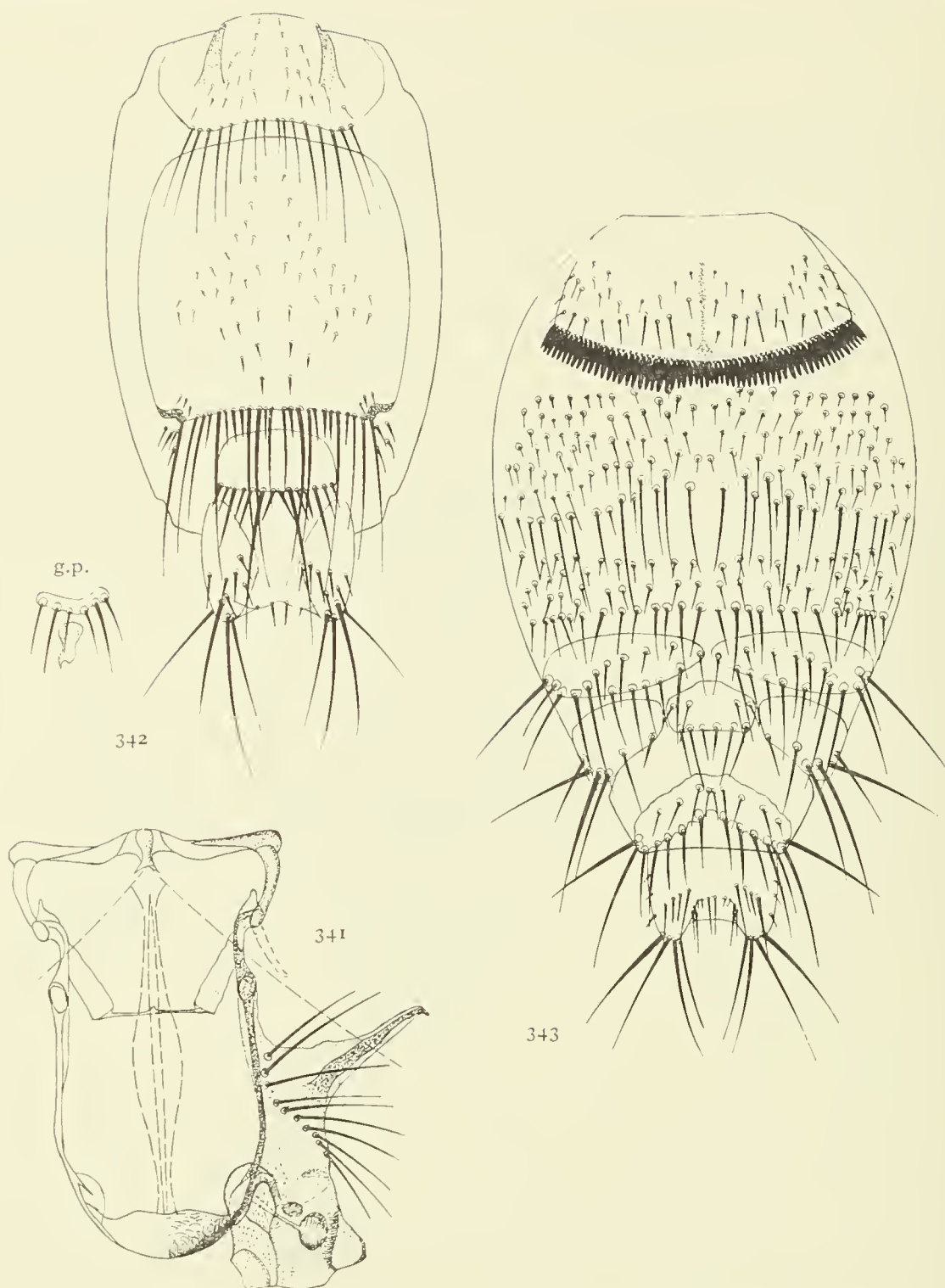
Figs. 338–340. *Basilia nana* Theodor & Moscona. Male. 338. abdomen, dorsal; 339. same, ventral; 340. genitalia.

*Male abdomen*. Tergites 2 and 3 with marginal rows of moderately long setae, tergites 4–6 with some long or very long setae in the middle of the marginal rows. Tergites 2–4 with groups of hairs on the surface, only a few short hairs on tergites 5 and 6. Abdominal ctenidium with 50–55 spines. Sternite 5 with a row of 6–8 short spines in the middle of the posterior margin.

*Genitalia*. Claspers curved, with dark tips and a subapical tooth. Aedeagus with broadly rounded end and a backwardly directed point. The rounded end bears secondary serrations. Parameres narrowly triangular, with a strong tooth at the ventral edge.

*Female abdomen*. Tergite 1 with a row of moderately long setae posteriorly. Tergal plate 2 nearly square, incompletely divided in the middle, with a row of long and short setae at the posterior margin. The lateral posterior corners are more heavily sclerotized and the lateral setae





Figs. 341-343. *Basilia nana* Theodor & Moscona. 341. dorsal pattern of thorax; 342. female abdomen, dorsal, and genital plates; 343. same, ventral.

of the marginal row are placed on this corner. No hairs on the lateral margins of the sclerite. Surface with a diamond-shaped field of short hairs which are longer posteriorly. Tergal plate 3 much narrower than tergite 2, with bare surface and with a marginal row of 4 long and several short setae. Anal segment short, with some long setae posteriorly. Sternite 5 divided into

elliptical lateral sclerites which reach to the midline. Sternite 6 divided into 3 triangular sclerites. Sternite 7 is also triangular, with the apex anteriorly. Genital plate small, with 4–6 setae. There is a small ventral plate of irregular shape in some specimens.

Distribution: Europe, Israel.

Type series in the Department of Parasitology, Hebrew University, Jerusalem.

## MATERIAL IN THE COLLECTION

## BRITISH ISLES

Gloucester, from *Myotis bechsteini*, 17.ix. 1954, R. S. George, 1 ♂.

Ludlow, Shropshire, from *Myotis bechsteini*, 3.ix. 1953, M. Blackmore, M. Rothschild, 2 ♂ 1 ♀.

## ROMANIA (previously Hungary)

Csetelek, Bihar Comitát, from *Rhinolophus ferrum-equinum*, 9.x. 1908, N. C. Rothschild, 1 ♀.

## ISRAEL

Rosh Pinna, from *Myotis nattereri*, 20.vi. 1946, O. Theodor, 5 ♂ 5 ♀ paratypes.

Mrar, near Rosh Pinna, from *Myotis nattereri*, 18.xi. 1946, O. Theodor, 1 ♂ paratype (Brit. Mus. 1947. 146).

## OTHER MATERIAL EXAMINED

Germany, from *Plecotus auritus*. Holland, from *Myotis dasycneme*, *M. emarginatus*, *M. bechsteini*. France, from *Myotis mystacinus*.

***Basilina nattereri* (Kolenati, 1857)**

(Figs. 344–348)

*Listropodia nattereri*. Kolenati, 1857, *Wien. Ent. Monatsschr.* 1, 61.

*Listropodia nattereri*. Kolenati, 1863, *Hor. Soc. Ent. Ross.* 2, 9.

*Penicillidia nattereri* (Kolenati). Speiser, 1901, *Arch. Naturgesch.* 67, 11 (*pro parte*).

*Basilina nattereri* (Kolenati). Theodor & Moscona, 1954, *Parasitology*, 44, 157.

*Basilina nattereri* (Kolenati). Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 31.

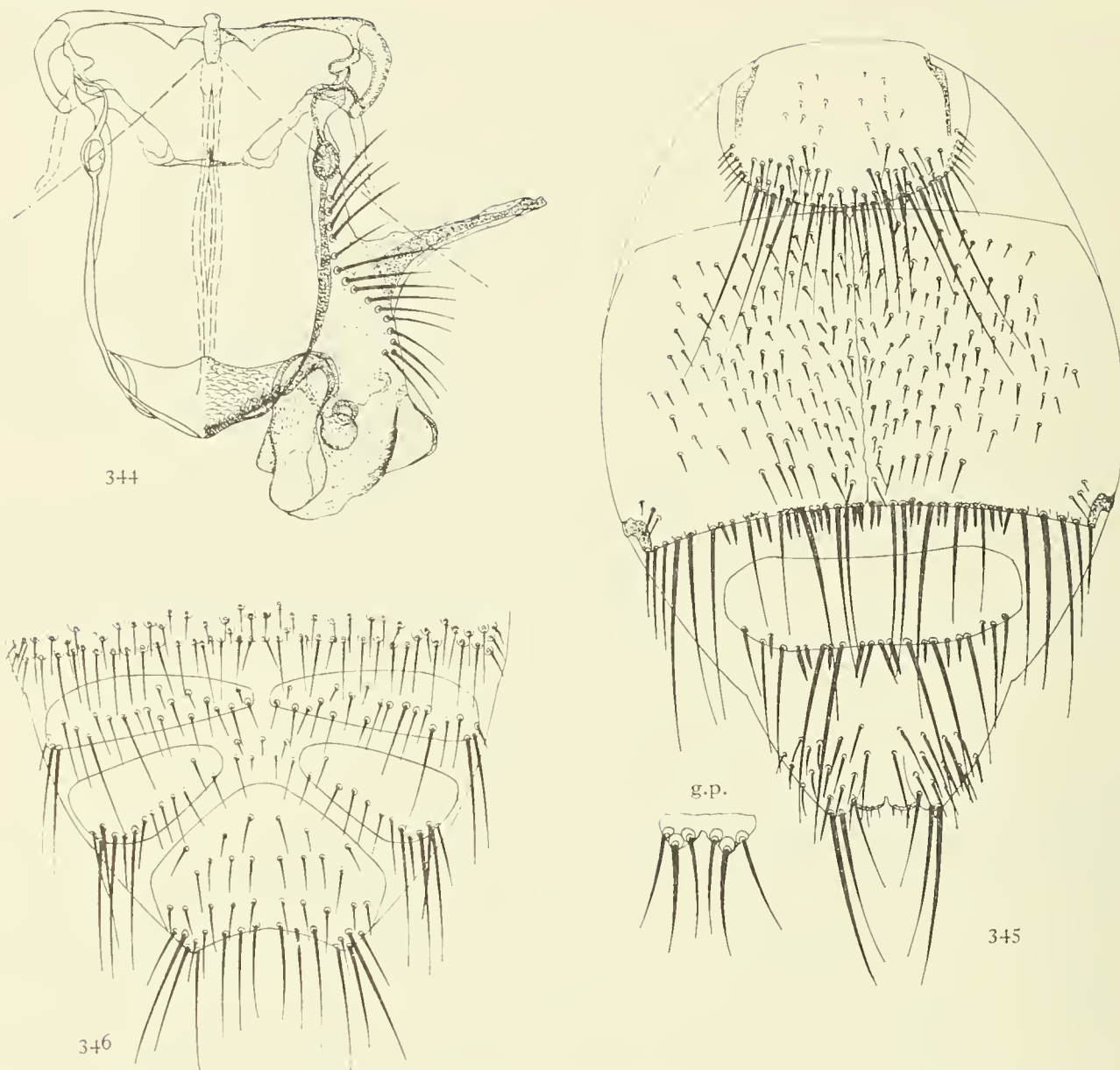
Length 3 mm. Head with 6 setae at the anterior dorsal margin. Labella of the proboscis slightly shorter than the theca.

*Thorax*. Wider than long, length to width = 5 : 7. Angle of oblique sutures 90°. Lateral plates of the notopleural sutures wide. About 15 notopleural setae which reach to near the anterior spiracle. Tibiae 3.5 times as long as wide, with 3 rows of setae in the distal half of the ventral edge.

*Male abdomen*. Tergite 1 with a double row of short setae posteriorly. Tergites 2–6 with marginal rows of moderately long setae and 2–4 longer setae in the marginal rows of tergites 4–6. Surface of tergites 2–5 covered with short hairs, but only one row on tergite 6. Abdominal ctenidium with 55 spines. Sternite 5 with a row of 6–8 long spines at the posterior margin.

*Genitalia*. Basal arc rounded, with long anterior process. Claspers short, curved, with dark ends. Aedeagus curved, with a long tip which ends in several long membraneous fringes. Short spines on the dorsal membrane. Parameres with triangular end and straight ventral edge, without ventral tooth.

*Female abdomen*. Tergite 1 rounded posteriorly, with a double row of setae which are much longer than in the male. Tergal plate 2 rectangular, wider than long, with a slightly concave posterior margin which bears a row of long setae and spines. The lateral corners are strongly sclerotized. Surface covered with short hairs which become gradually longer posteriorly. Tergal



Figs. 344-346. *Basilia nattereri* (Kolenati). 344. dorsal pattern of thorax; 345. female abdomen, dorsal, with genital plate; 346. same, ventral, posterior part.

plate 3 wide, with bare surface and with a marginal row of 8-10 setae and spines. Anal segment short, conical, with short setae on the surface and longer setae posteriorly. Sternite 1 + 2 with a ctenidium of about 60 spines. Sternite 5 divided into elliptical lateral sclerites which reach to the midline. Sternite 6 also divided into triangular halves with some short setae between the plates. Sternite 7 triangular, covered with short setae and a row of long setae posteriorly. Dorsal genital plate small, with about 6 setae. Anal sclerite represented by two isolated setae.

Distribution: Continental Europe.

#### MATERIAL EXAMINED

A female from Kolenati's collection in the Muséum d'Histoire Naturelle in Paris which may be considered as the type.

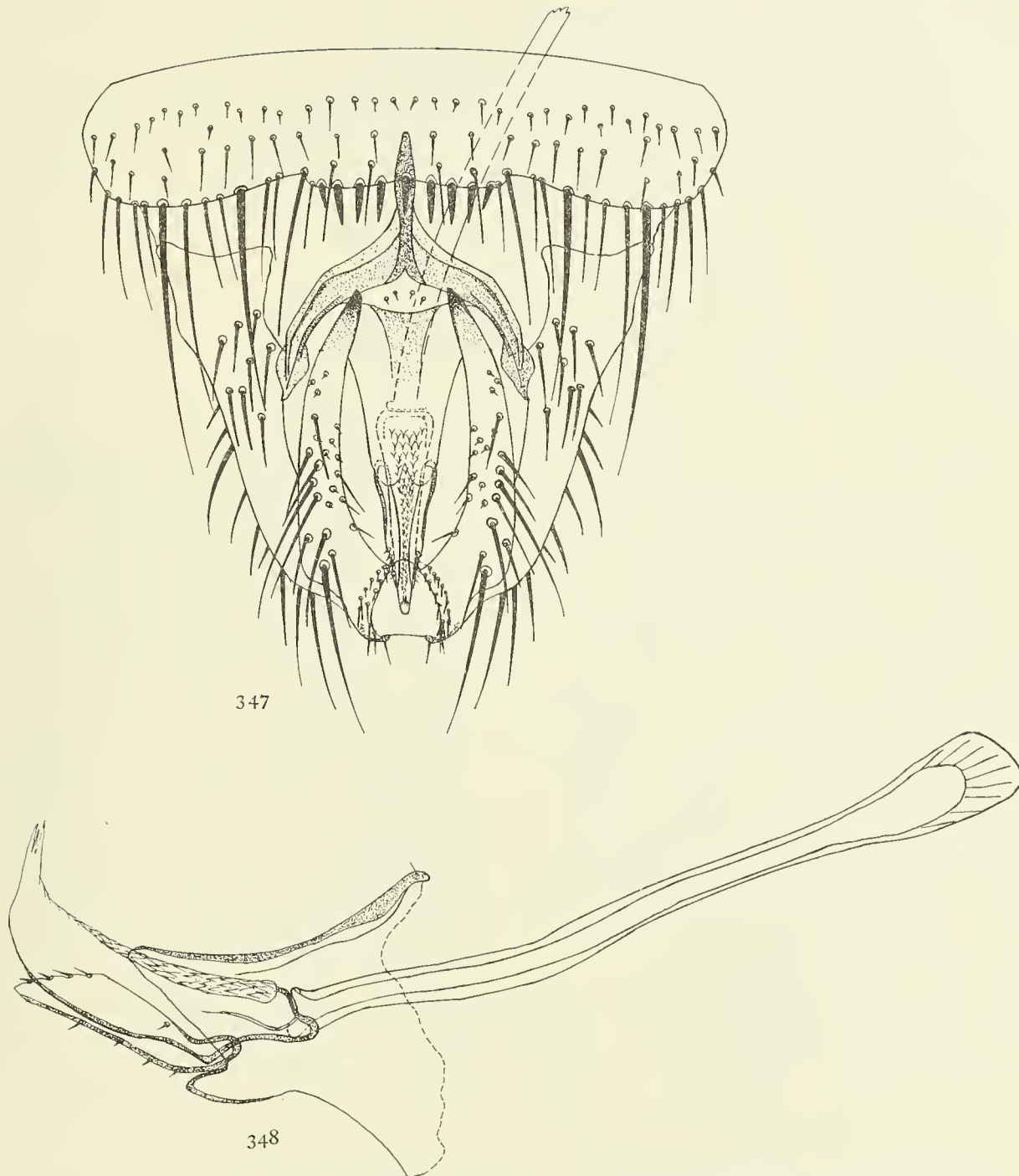
#### FRANCE

Angers, from *Eptesicus serotinus*, 27.ii. 1883, 1 ♂ 1 ♀.

#### CRIMEA

1 ♂, no further data.





Figs. 347, 348. *Basilina nattereri* (Kolenati). Male. 347. sternite 5 and genital area; 348. genitalia.

***Basilina pudibunda* Schuurmans Stekhoven, 1941**

(Figs. 349-355)

*Basilina pudibunda* Schuurmans Stekhoven, 1941, *Bull. Hist. Nat. Belg.* **17**, 1.

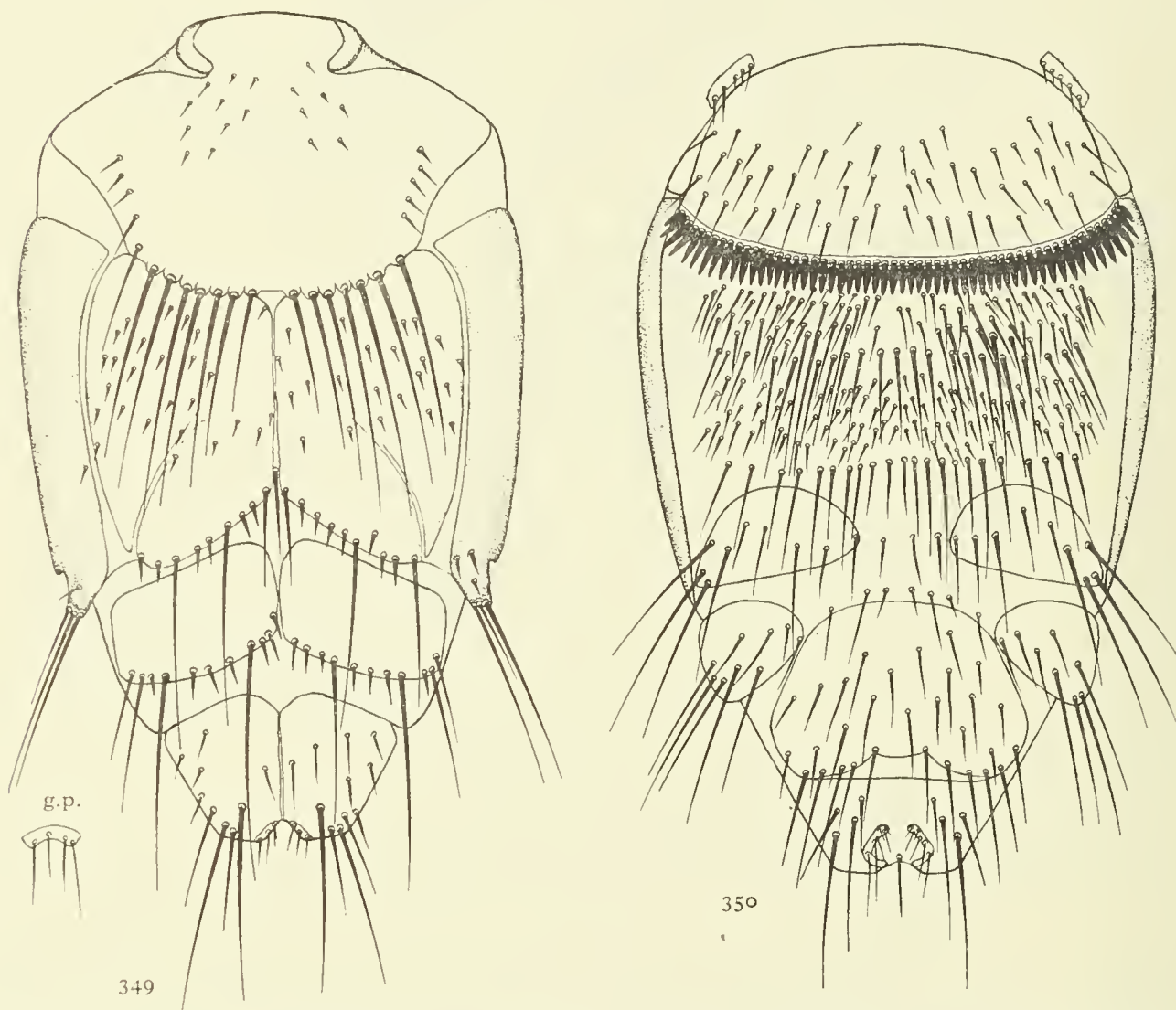
*Basilina pudibunda* Schuurmans Stekhoven. Theodor, 1956, *Parasitology*, **46**, 353.

Length 1.5-2 mm. Colour yellowish. Feebly sclerotized.

*Head.* 2 setae at the anterior dorsal margin. Labella of the proboscis slightly longer than the theca.

*Thorax.* Wider than long. Length to width = 4:5. Angle of the oblique sutures 95–100°. About 12 notopleural setae. Tibiae 3 times as long as wide.

*Male abdomen.* Tergite 2 with a marginal row of moderately long setae alternating with short setae laterally. A group of short spines in the middle of the surface. Tergites 3–6 narrow with similar marginal rows and groups of spines on the surface, which become less numerous on the posterior tergites. 2–4 very long setae in the marginal rows of tergites 4–6. Anal segment



Figs. 349, 350. *Basilia pudibunda* Schuurmans Stekhoven. Female. 349. abdomen, dorsal, with genital plate; 350. same, ventral.

conical, with long setae posteriorly and shorter setae on the dorsum. Sternite 1 + 2 with a ctenidium of 44 spines. Sternite 5 with a marginal row of 6 long setae alternating with shorter setae. There is no group of spines as in most other species of the genus.

*Genitalia.* Basal arc broadly rounded, with a short anterior process. Claspers thin, curved, scarcely tapering, with a short point. A long seta dorsally near the base and a double row of shorter setae on the dorsal surface. Phallobase conical, concave dorsally. Aedeagus straight,

tapering, with a long, upturned tip which ends in a fringe of scales. Apodeme very narrow. Parameres slipper-shaped, with a rounded tip which bears a few short hairs.

*Female abdomen.* Tergite 1 rounded posteriorly with a row of about 15 long setae with a small gap in the middle. Tergal plate 2 was incorrectly described in the 1956 paper, as only a

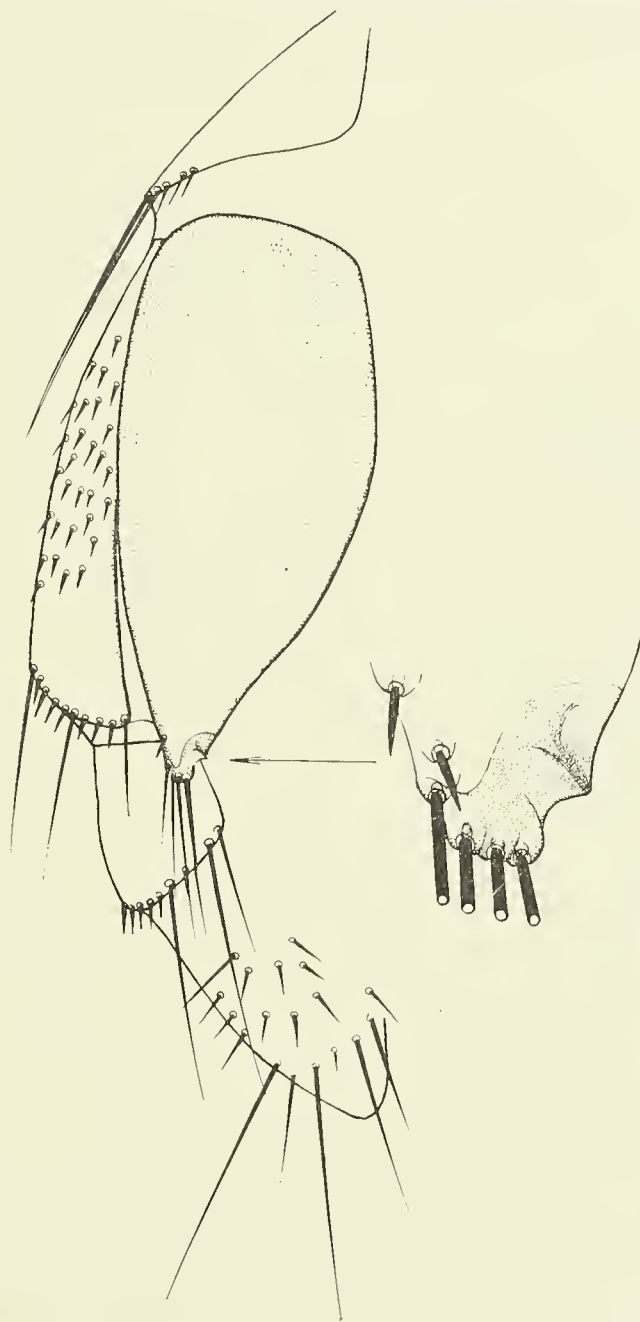
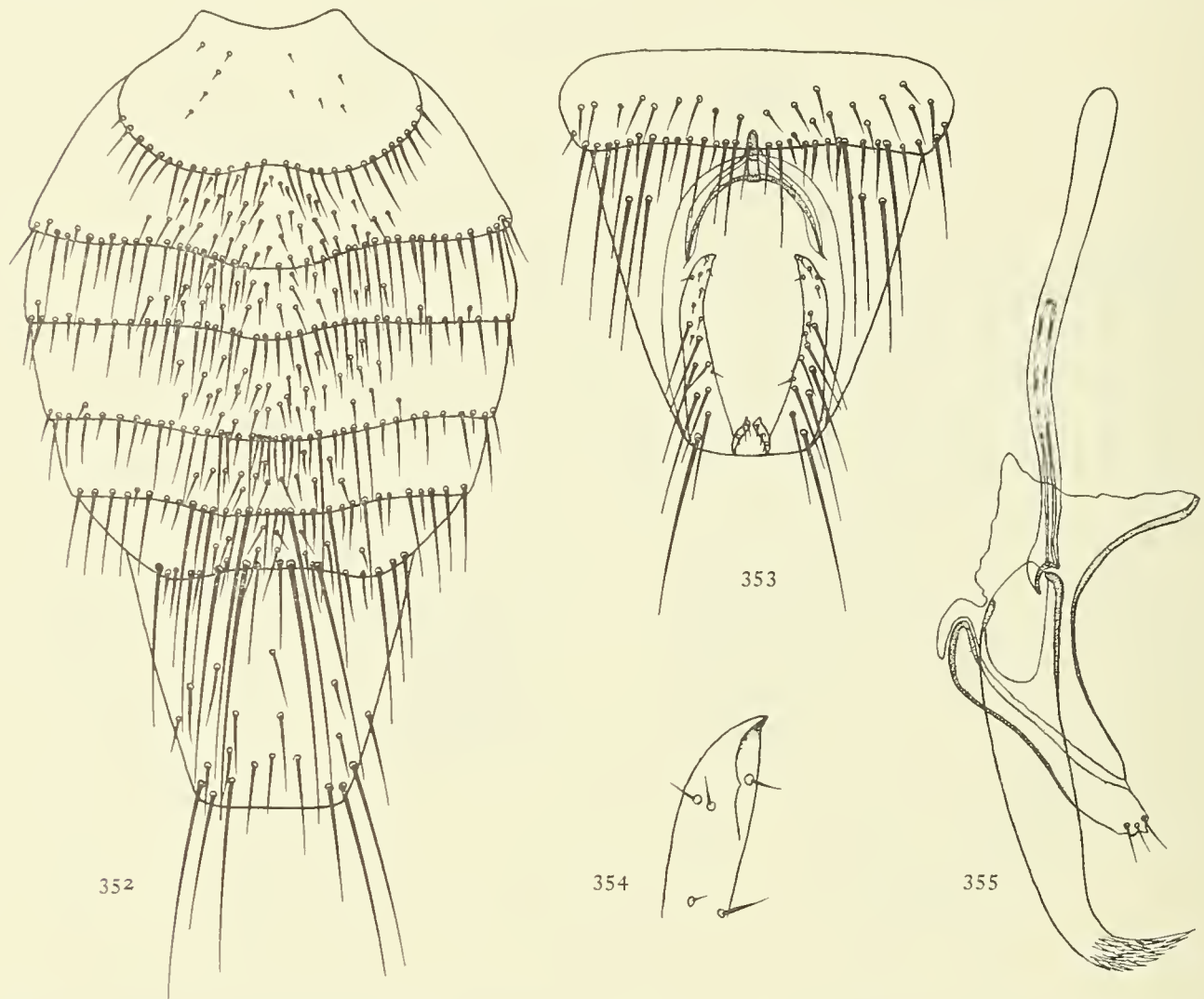


Fig. 351. *Basilia pudibunda* Schuurmans Stekhoven. Female abdomen, side view and postero-lateral corner of tergal plate 2 more highly magnified.

single specimen was available, on which it was not possible to make out all the details. The tergal plate is very wide, its sclerotized lateral parts covering the pleurae in part. The tergal plate is divided into 4 longitudinal parts, only the 2 median ones of which were recognized in the previous description. The median parts are covered with hairs anteriorly, the posterior parts are bare and resemble the sclerites of tergal plate 3 in their chaetotaxy. The lateral



parts are bare on the surface, wider anteriorly, with a small, more heavily sclerotized plate posteriorly. This consists of a median lobe which bears 3-4 long setae and a bare lateral lobe. The posterior margin of the inner parts of tergal plate 2 forms an obtuse angle with the apex anteriorly. There are 2-3 long setae and spines in each half. Tergal plate 3 consists of 2 obliquely placed sclerites with 2-3 setae and some short spines at the posterior margin. They are bare on the surface. The similarity of the sclerites of tergal plate 3 with the posterior parts of tergal plate 2



Figs. 352-355. *Basilia pudibunda* Schuurmans Stekhoven. Male. 352. abdomen, dorsal; 353. sternite 5 and genital area; 354. tip of clasper; 355. genitalia.

makes it probable that more than one tergite is incorporated in tergal plate 2. Anal segment short, conical, with long setae posteriorly and short setae dorsally. Sternite 1 + 2 very short, with a ctenidium of 55 short, thick spines. Post-spiracular sclerite narrow, with a longer seta at each end and shorter setae between them. Sternite 3 with a marginal row of moderately long setae. Surface thickly covered with rather long setae which form two denser groups laterally. Sternite 5 with widely separated lateral sclerites with 4 long vertical setae laterally and short setae on the surface. 3-4 setae between the plates. Sternite 6 with 2 even more widely separated triangular sclerites with the large triangular sternite 7 between them. The marginal row of

sternite 6 lies close to the anterior margin of sternite 7. Two groups of 5 long setae at the lateral posterior corners of sternite 7 and 3 rows of shorter setae on the surface. Genital plate concave posteriorly, with 4 setae. Anal sclerite indicated by one or two isolated setae.

Distribution: Borneo, Thailand, Indochina, Sumatra.

Type series either in the Royal Museum of Natural History, Brussels or in the collection of the late Dr Schuurmans Stekhoven. In the 1956 paper it was erroneously stated that the types are deposited in the British Museum.

#### MATERIAL IN THE COLLECTION

##### THAILAND

From *Myotis horsfieldi*, 1 ♂ 1 ♀, N. C. Rothschild.

#### OTHER MATERIAL EXAMINED

Indochina, Saigon, from *Cynopterus brachyotis angulatus*, and from East Sumatra.

#### HOST SYNONYMY

Name on original label	Current name
<i>Vespertilio adversus horsfieldi</i> Temminck.	<i>Myotis horsfieldi</i> Temminck.

#### EILEENAE GROUP

#### **Basilia borneensis** n.sp.

(Figs. 356–359)

Length 1.8 mm. Colour brown.

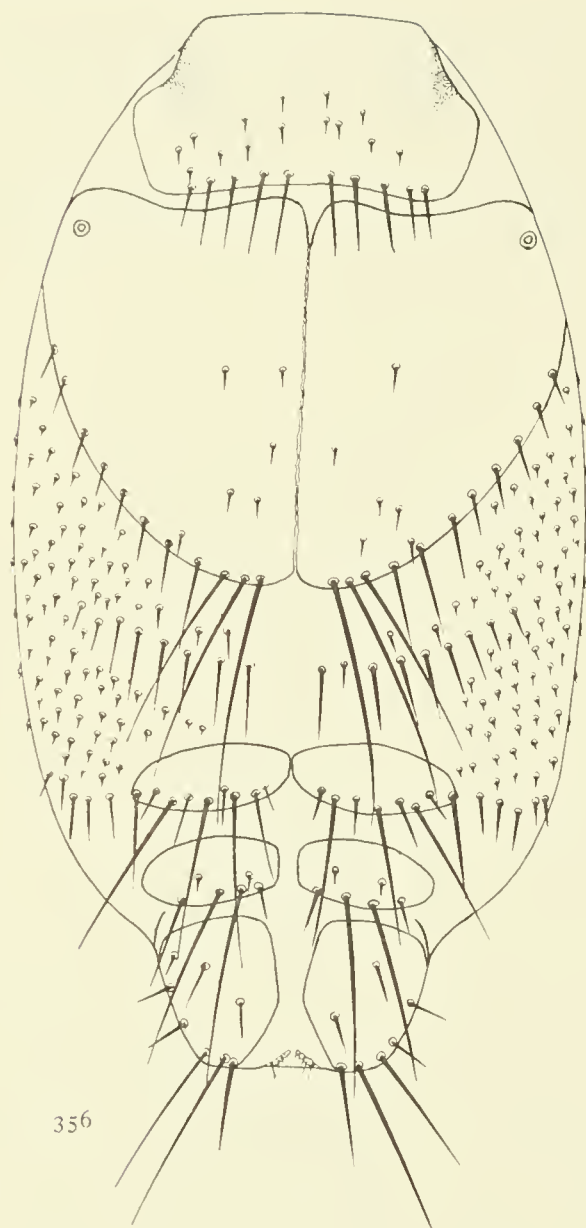
*Head.* Eyes deeply divided. 4–6 setae at the anterior dorsal margin. Labella of the proboscis slightly more than half the length of the theca.

*Thorax.* Wider than long. Length to width = 7:9. Angle of the oblique sutures 90°. 7–8 notopleural setae. Tibiae 3.5 times as long as wide, longer and more pointed than in *B. eileenae*.

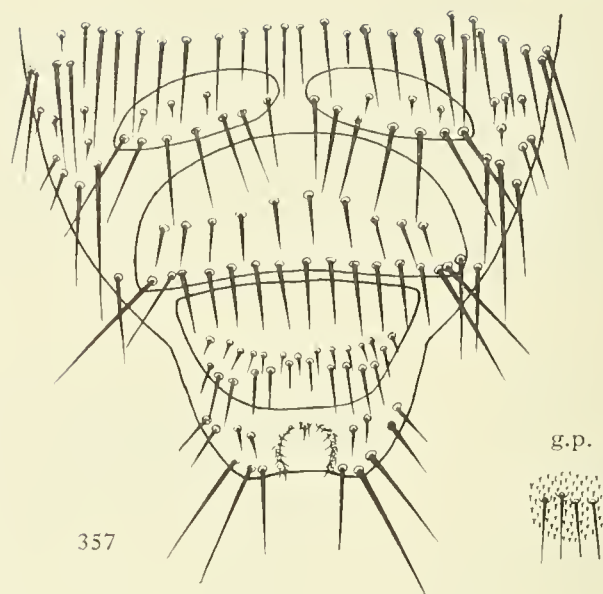
*Male abdomen.* As in *B. eileenae*, but there is a group of short hairs on the surface of tergite 2. Tergite 6 longer and more convex than in *B. eileenae*, with about 6 very long vertical setae in the marginal row. Abdominal ctenidium with 55 spines which are 0.08 mm. long, as in *B. eileenae*. Sternite 5 trapezoidal, with a group of about 18 long blunt spines.

*Genitalia.* Basal arc rounded, broad, ill defined. Phallobase short, conical, with 2 setae at the base and 2 in the middle. Aedeagus short, broad, slightly turned up. Parameres triangular, with a sharp point and a lateral ridge. Apodeme long, with a narrow end plate.

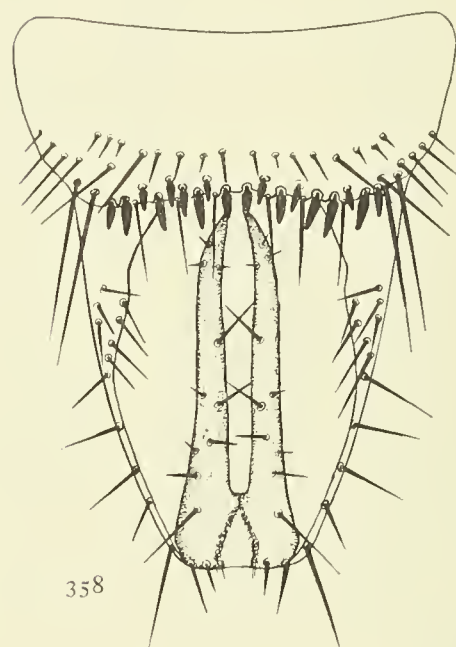
*Female abdomen.* Tergal plate 2 longer than in *B. eileenae*, about as long as wide. 3–4 long vertical setae in the middle of the marginal row in each half. A row of 10 long spines at the oblique lateral margins. About 8–10 short hairs on the surface of each half of the tergal plate and 5–6 in the anterior lateral corners. A transverse row of short setae on the connexivum between tergal plates 2 and 3. Tergal plates 3 and 4 with elliptical lateral sclerites with 3–4 vertical setae at the posterior margin and with some short spines. (Tergal plate 4 is probably analogous with tergite 6 in other species.) A row of 3–4 setae lateral to tergal plate 3. Ventral surface similar to that of *B. eileenae*. Spines of the abdominal ctenidium 0.09 mm. long. Anal sclerite of irregular form, with 3–4 setae. Genital plate rounded, with a row of 4 setae.



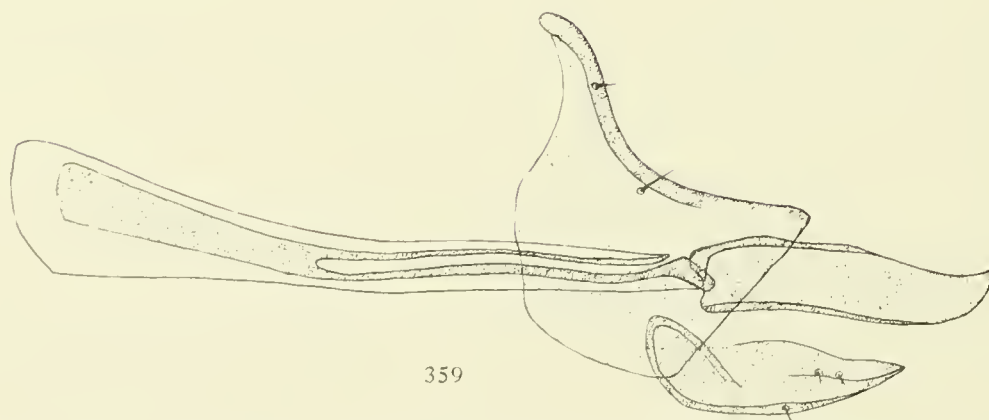
356



357



358



359

Figs. 356-359. *Basilia borneensis* n.sp. 356. female abdomen, dorsal; 357. same, ventral, posterior part, with genital plate; 358. male sternite 5 and genital area; 359. male genitalia.



This species resembles *B. eileenae* closely and may eventually prove a subspecies of it, when more information about the distribution of this group becomes available.

BORNEO. Mt Kinabalu, Tenompok, from small brown bat, 31.vii. 1951, R. Traub, ♂ holotype, 1 ♂ 1 ♀ paratypes, RTB-9090. Chicago Natural History Museum.

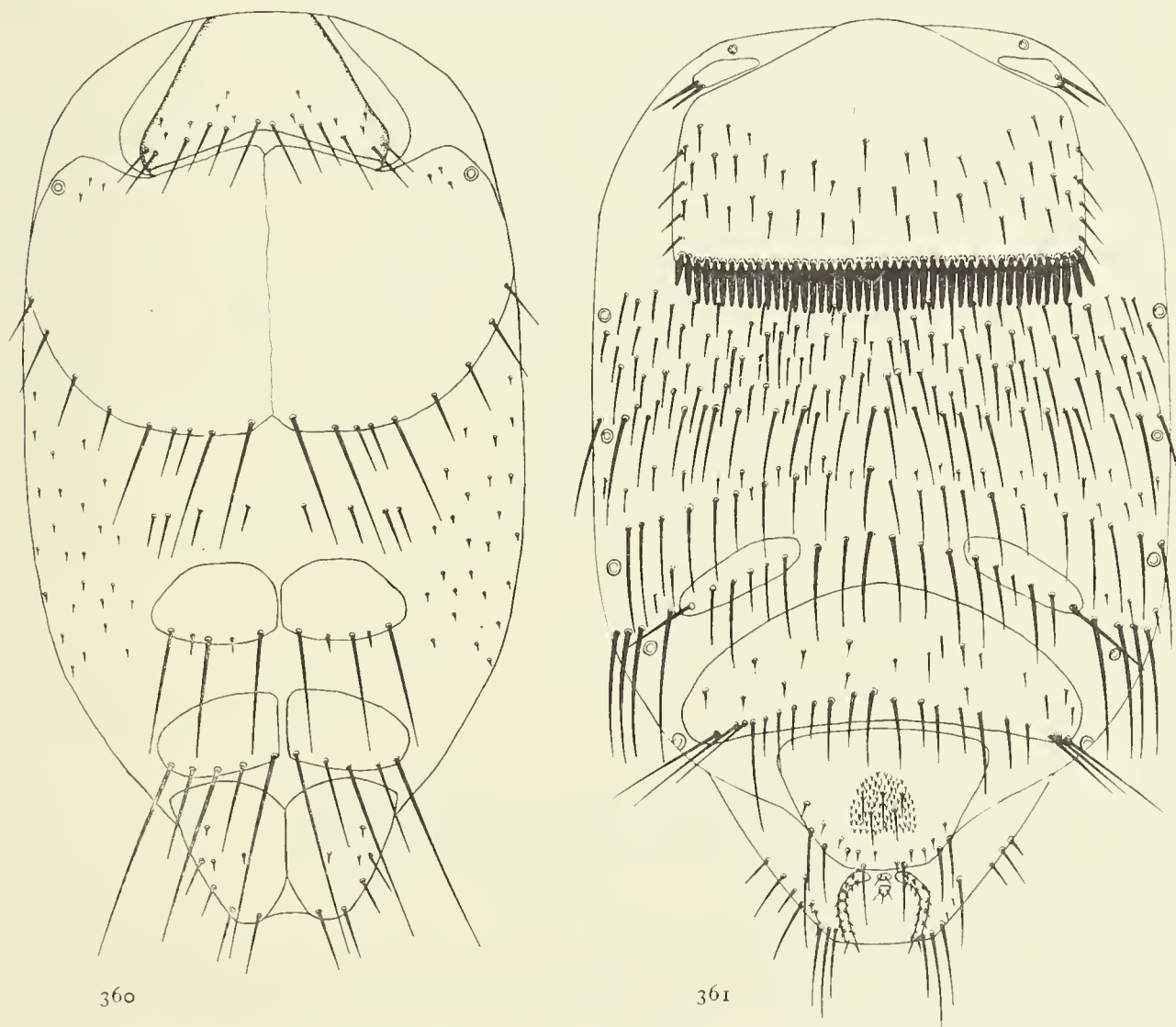
***Basilia eileenae* Scott, 1936**

(Figs. 360-364)

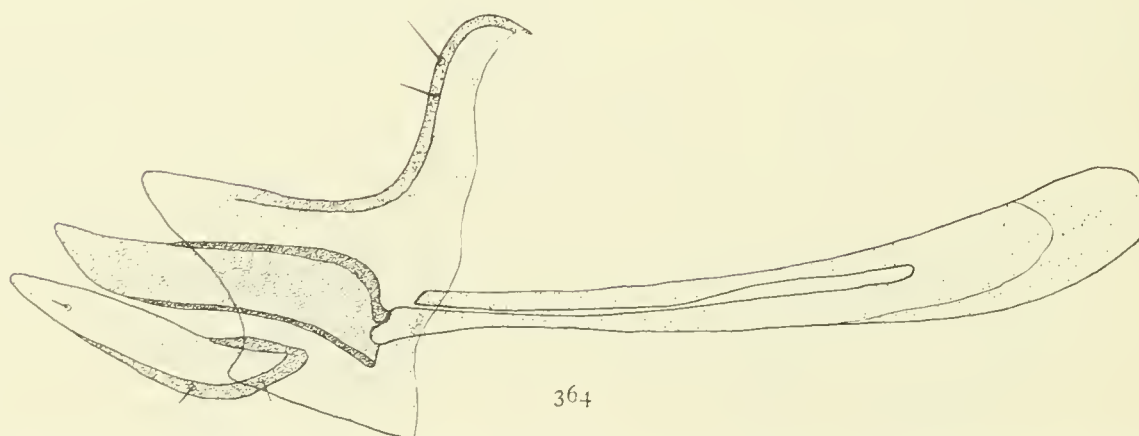
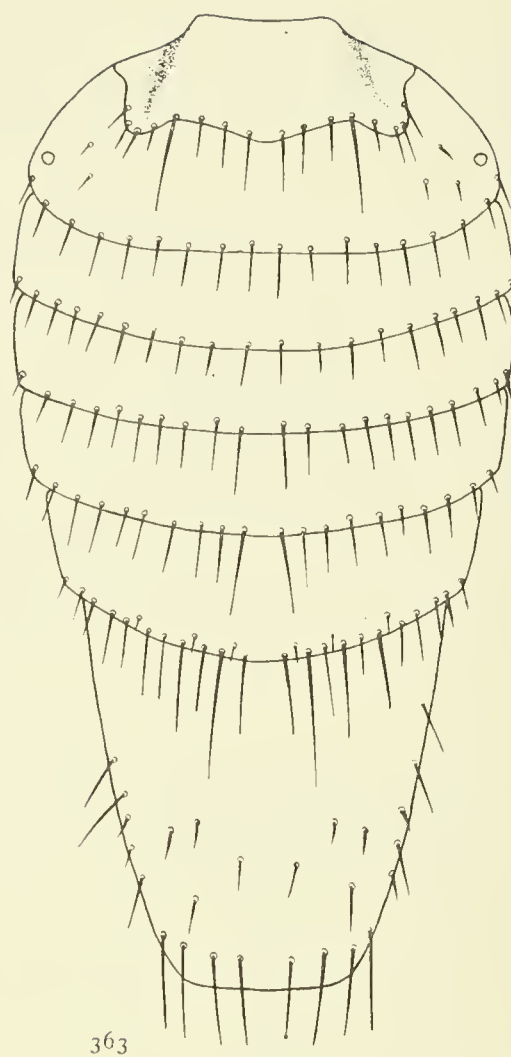
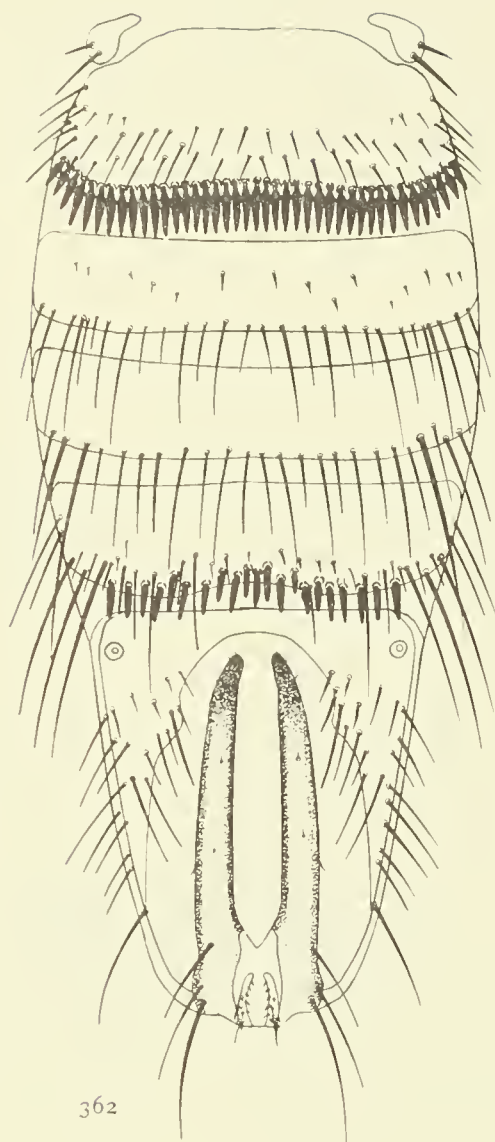
*Basilia eileenae*. Scott, 1936, *Linn. Soc. Jour. Zool.* 39, 479.

Length 1.5-1.75 mm. Colour yellowish. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis much shorter than the theca.

*Thorax*. Rounded anteriorly, much wider than long. Length to width = 3 : 4. Angle of the oblique sutures about 100°. Notopleural sutures convex laterally; only 5-6 notopleural setae. Lateral plates very wide. Thoracic ctenidium with 13-15 spines. Legs short, tibiae 2.8-3 times as long as wide, with a well-marked concavity of the basal part of the ventral edge.



Figs. 360, 361. *Basilias eileenae* Scott. Female. 360. abdomen, dorsal; 361. same, ventral.



Figs. 362-364. *Basilia eileenae* Scott. Male. 362. abdomen, ventral; 363. same, dorsal; 364. genitalia.

*Male abdomen.* Post-spiracular sclerite wider near the spiracle, with 1 or 2 long spines near the spiracle and 2–3 shorter spines. Tergites 1–5 with marginal rows of short setae and bare surface. Tergite 6 with 4–6 long and strong setae in the middle of the marginal row. Anal segment conical, as long as tergites 3–6 together. Sternite 1 + 2 short, with a ctenidium of about 40 spines and 2–3 rows of short hairs on the surface. Sternites 3 and 4 with marginal rows of short, thin setae. A transverse row of minute hairs on sternite 3, sternite 4 bare. Sternite 5 longer, with a double row of about 22 long, blunt spines on the greater part of the posterior margin. Several long setae laterally and a premarginal row of short, thin setae. Anal segment with groups of thick setae laterally near the base on the ventral side.

*Genitalia.* Basal arc rounded, weakly sclerotized. Claspers long, straight, slender, with dark ends and a row of short setae on the dorsal surface; the basal seta not much longer than the others. Phallobase short, concave dorsally, with 4 short setae near the base. Aedeagus short, with blunt end, tapering slightly. Parameres triangular, with rounded base and blunt end. Apodeme long and slender.

*Female abdomen.* Tergite 1 as in the male. Tergal plate 2 large, rounded, divided in the middle, with a marginal row of 4 longer setae in the middle and shorter setae laterally. Surface bare. Tergal plates 3 and 4 with elliptical lateral sclerites, each bearing a marginal row of 3–4 setae alternating with short spines or short setae. A single row of short setae on the connexivum between tergal plates 2 and 3 which perhaps indicates the posterior margin of a tergite. Anal segment short, conical, with 3–4 setae at the posterior processes. Sternite 1 + 2 much longer than in the male, with a ctenidium of 45 spines which are 0.07 mm. long. Sternites 3 and 4 membranous. Sternite 5 with 2 narrow, obliquely placed sclerites which do not reach the mid-line. There are 5 setae between them which continue the marginal rows of the sclerites of sternite 5. 1–2 vertical setae at the lateral posterior corners of the sclerites. 6 closely placed setae of the marginal row laterally to the sclerites. Sternite 6 undivided, with straight posterior margin and a marginal row of short setae. 2 vertical setae in the lateral corners and several short setae on the surface. Sternite 7 triangular, rounded posteriorly, with a marginal row of short and longer setae and a few premarginal setae. The genital plate consists of a field of minute spines and 2 rows of longer setae in the middle of the field.

#### MATERIAL IN THE COLLECTION

##### CEYLON

Mousakande, Gammaduwa, from *Murina cyclotis eileenae*, I.viii. 1933, W. W. A. Phillips, ♂ holotype, 1 ♂ 2 ♀ paratypes (Brit. Mus. 1936.99).

#### ***Basilia pectinata* n.sp.**

(Figs. 365–368)

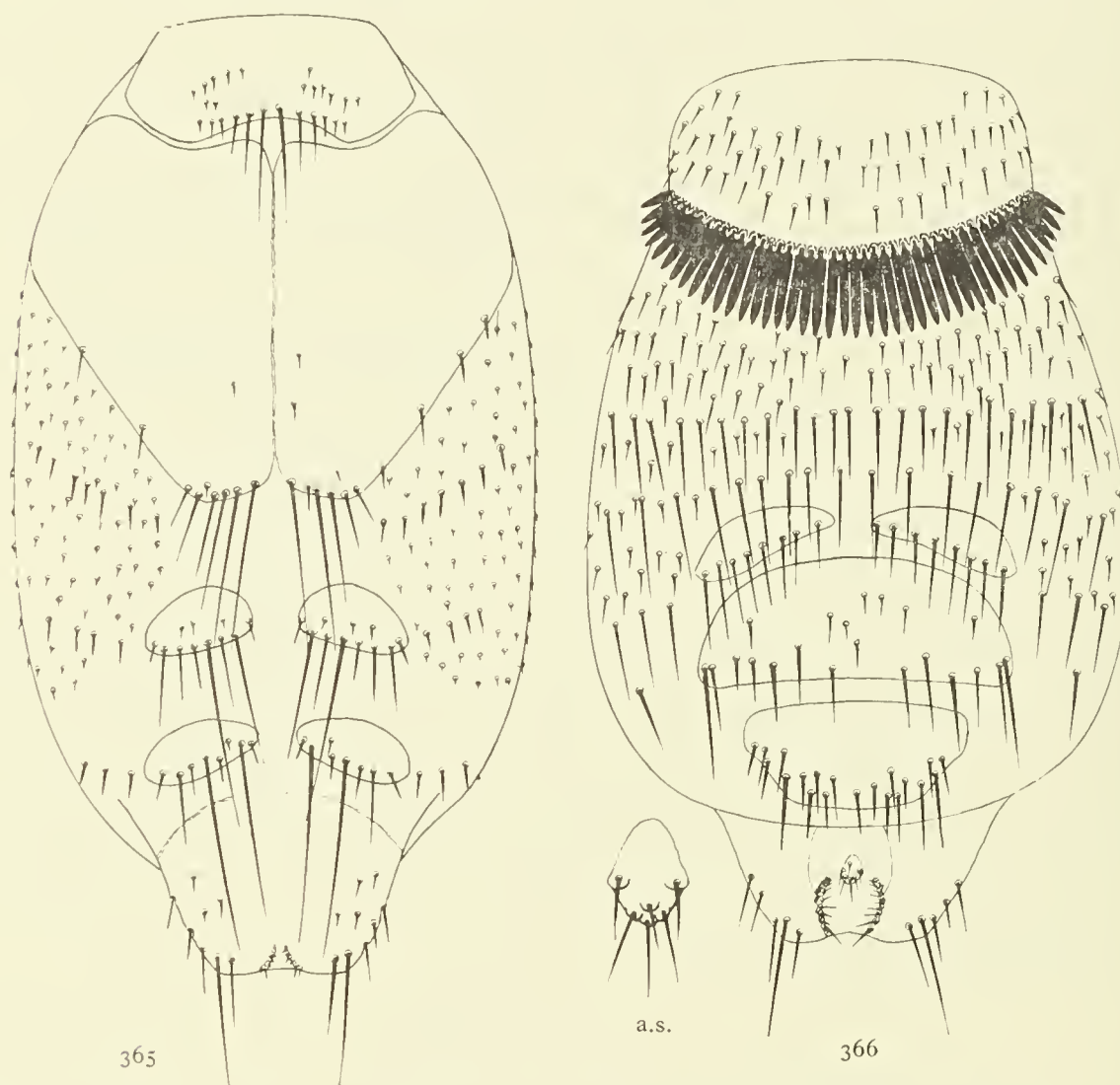
Length 2 mm. Colour brown. Head as in *B. eileenae*, thorax 0.8 mm. long, 1 mm. wide. Angle of oblique sutures 100°. 6–7 notopleural setae. Tibiae more slender than in *B. eileenae*, with more pointed apical ends, 3.5 times as long as wide.

*Male abdomen.* Similar to that of *B. borneensis*, with long tergite 6, but tergite 2 is bare on the surface. The spines of the abdominal ctenidium are long, 0.11–0.12 mm.



*Genitalia.* Basal arc broadly rounded, with a long anterior process. Claspers relatively shorter than in *B. eileenae*, more strongly tapering, not reaching the posterior margin of sternite 5. Phallobase with 6 setae near the base. Aedeagus broad, with rounded end. Parameres triangular, with pointed apical end.

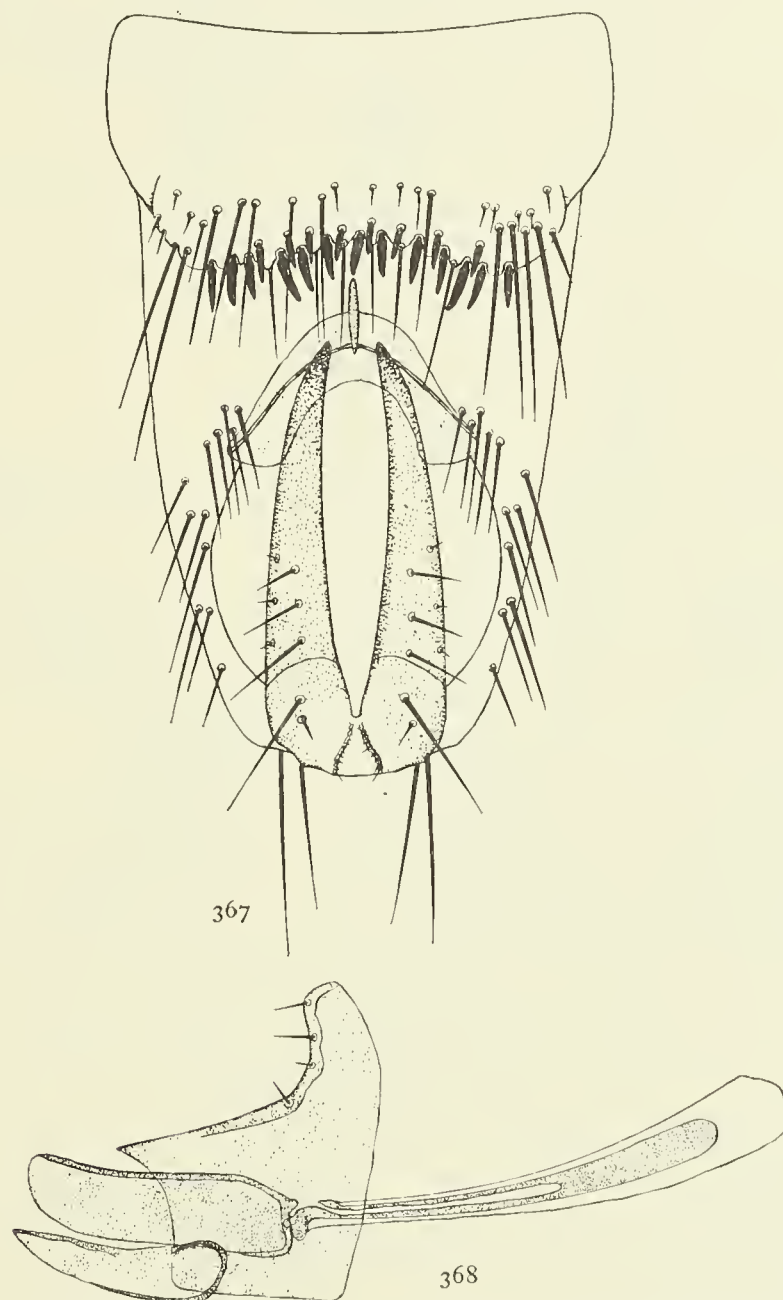
*Female abdomen.* Tergite 1 with concave posterior margin which bears long setae in the middle and short setae laterally. Tergal plate 2 broadly heart-shaped, as long as broad, divided



Figs. 365, 366. *Basilia pectinata* n.sp. Female. 365. abdomen, dorsal; 366. same, ventral, with anal sclerite.

in the middle. 1-2 long setae, a few short setae and some spines at the posterior margin. Only 2-3 long spines at the oblique lateral margins and a few scattered spines on the surface. Tergal plates 3 and 4 with lateral elliptical sclerites with 1-2 long setae, some short setae and some short spines at the posterior margin. The row of setae present in *B. eileenae* and *borneensis* on the connexivum between tergal plates 2 and 3 is indicated by 2 short rows of spines at the sides of the connexivum which are longer than the others. The median part of the dorsum between the sclerites is bare. Anal segment short, rounded, with 2-3 setae posteriorly. Sternite 1 + 2 rectangular, longer than in *B. eileenae*, with a ctenidium of 46 spines which are about twice as

long as in *B. eileenae* (0.15 mm.). 3 rows of short setae on the surface. Sternite 5 with lateral sclerites which reach the midline. They bear 2 long setae laterally and shorter setae in the middle. 3 long setae lateral to the sclerites continue the marginal rows of the sclerites on the pleurae. Sternite 6 undivided, nearly semicircular, with straight posterior margin, with 2 long setae at



Figs. 367, 368. *Basilias pectinata* n.sp. Male. 367. sternite 5 and genital area; 368. genitalia.

the posterior lateral corners and shorter setae along the margin. One seta lateral to sternite 6. Sternite 7 also semicircular, with the anterior margin straight, and a group of longer and shorter setae posteriorly. Anal sclerite with about 6 setae. Genital plate rounded, with about 6 setae in 2 rows on an area of minute spines.

Male and female described here are from different localities, but seem to differ from *B. eileenae*

in the same character, that is, the length of the spines of the abdominal ctenidium. They are provisionally considered to belong to the same species.

## MATERIAL IN THE COLLECTION

## JAVA

Bantam, from *Phoniscus javanus* Thomas, H. B.  
Forbes, ♀ holotype.

## THAILAND

Klong Bang Lai near Pathin, Peninsular Siam, from  
*Phoniscus atrox*, Jan. 1916, C. Boden Kloss, N. C.  
Rothschild, ♂ paratype.

## HOST SYNONYMY

## Name on original label

## Current name

*Kerivoula javana* Thomas.  
*Kerivoula* sp.

*Phoniscus javanus* (Thomas).  
*Phoniscus atrox* Miller.

## BATHYBOTHYRA GROUP

***Basilias afghanica*** n.sp.

(Figs. 369, 370)

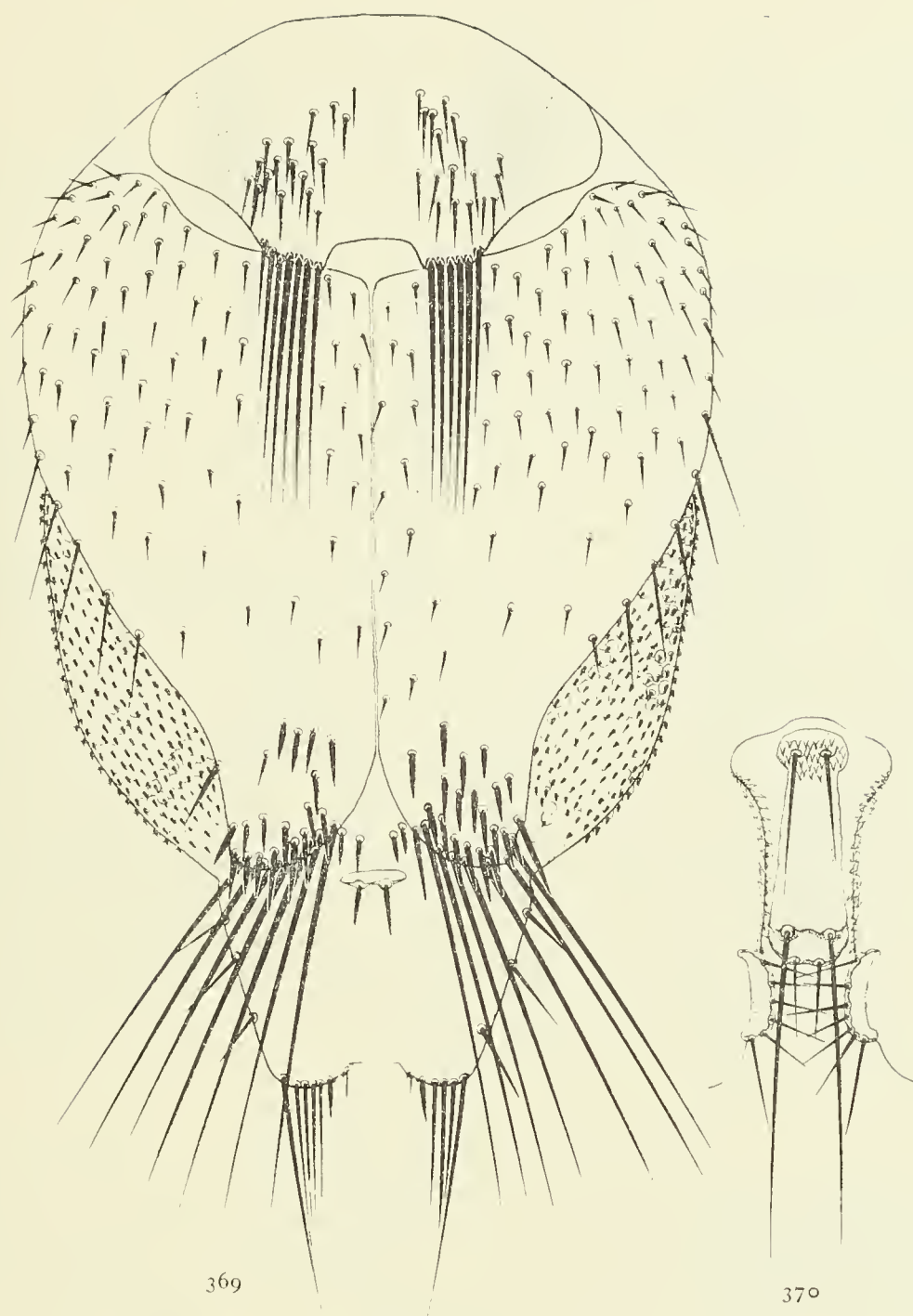
Length 3 mm. Colour brown. Head with 6 setae at the anterior dorsal margin. Eyes with 2 or 3 lenses on a pigmented base with a small posterior opening. Labella of the proboscis very short, about one-quarter the length of the theca.

*Thorax*. Much wider than long. Length to width = 2 : 3. Angle of oblique sutures 95°. Posterior margin of the sternal plate with short setae and 3 long setae at each side. 9–11 notopleural setae. Tibiae 5 times as long as wide, with long, tapering ends and 3 rows of setae in the distal half of the ventral edge, those of the basal row very short.

*Female abdomen*. Post-spiracular sclerite curved, with 2–3 setae near the spiracle and 3–4 short spines. Tergite 1 with 2 posterior lobes, each carrying 5–6 very long setae and a group of long, thick spines on the surface. Tergal plate 2 large, heart-shaped, divided in the middle, with 2 broad, rounded, posterior processes, each of which bears 5–7 very long and strong setae and anterior to them a group of long, thick spines in 3–4 rows. A row of 4 short setae at the oblique posterior margins. The surface is covered with short spines in the anterior part, leaving a bare area between the anterior group of spines and the group on the posterior processes. Tergal plate 3 very small, transversely elliptical, with only 2 long spines at the posterior margin. Anal segment short, slightly conical, with short setae laterally and longer setae posteriorly. Pleurae covered with short, thick spines. Sternite 1 + 2 large, rectangular, with a ctenidium of 66 long spines and short setae on the surface. Sternites 3 and 4 membranous, with marginal rows of moderately long setae and short hairs on the surface. Sternite 5 with narrow curved lateral sclerites which do not quite reach the midline, and two setae between them. They have moderately long setae posteriorly and 1–2 long vertical setae laterally. Sternite 6 with 2 rectangular sclerites with similar marginal rows and 2–3 vertical setae laterally. Sternite 7 trapezoidal, with several longer and shorter setae on the surface, leaving a median strip bare. Genital plate with 2 setae on a small field of minute spines. Anal sclerite long, slender, with 2 long setae and 2 short setae posteriorly. Two parts of the anal frame have become separated and form adanal plates as in many species of *Tripselia*.

Male unknown.





Figs. 369, 370. *Basilia afghanica* n.sp. Female. 369. abdomen, dorsal; 370. anal sclerite and genital plate.

This species resembles *B. daganiae* in many respects, but differs in the shape of tergal plate 3 of the abdomen and in many details of chaetotaxy, as well as in its larger size. The new species shows closer relationship to the African species of the *bathybothyra* group than to the Oriental species.

AFGHANISTAN. Kabul, 15.vi. 1953, J. Klapperich, ♀ holotype in the Department of Parasitology, Hebrew University, Jerusalem.

***Basilia ansifera* Theodor, 1956**

(Figs. 371-374)

*Basilia ansifera*. Theodor, 1956, *Parasitology*, **46**, 353.*Penicillidia fletcheri* var. *pumila* Scott. Falcoz, 1924, *Bull. Hist. Nat. Paris*, **30**, 223.*Penicillidia bathybothyra* Speiser. Bequaert, 1933-35, *Parc Nat Albert, Mission de Witte*, fasc. 79, 89.*Basilia ansifera*. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2 mm. Colour yellowish brown. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis about half the length of the theca.

*Thorax*. Wider than long. Length to width = 5 : 6. Angle of the oblique sutures 90°. 6-8 notopleural setae. Tibiae 4 times as long as wide.

*Male abdomen*. Tergite 2 triangularly produced posteriorly, with a group of 8-10 closely placed long setae in the middle. 2-4 very long setae in the middle of the marginal rows of tergites 3-6. Surface of tergites 3-6 bare, except for some minute spines at the sides of the surface. Sternite 5 with a double row of 16-24 short spines at the posterior margin.

*Genitalia*. Aedeagus straight and of about equal width in the basal two thirds, curved and tapering to a point in the apical third. Parameres with a long, slightly curved apical process, a blunt ventral corner and a few minute hairs dorsally.

*Female abdomen*. Tergite 1 with 2 groups of 3-5 very long setae, and with a concave gap between the groups. Tergal plate 2 heart-shaped, with long posterior processes which bear 3-5 very long and thick setae. They are only slightly longer, but much thicker than those of tergite 1. Short spines on the surface of the plate. Tergal plate 3 with rather long posterior processes which each bear a long seta and 2 short spines. Anal segment longer than wide, nearly parallel-sided. Pleurae covered with minute spines. Abdominal ctenidium with 60-70 spines. Sternites 5 and 6 with lateral sclerites. Anal sclerite drop-shaped, with 2 longer setae at the widest part and 4-5 short setae posteriorly. Genital plate small, rounded, with minute hairs and 2-4 setae posteriorly.

Distribution: West Africa, Congo, eastwards to Lake Victoria and Lake Nyanza, nearly all records between 10° Lat. North and South. (Map 3.)

## MATERIAL IN THE COLLECTION

## LIBERIA

Begwai Bassa, W.C.P., 12.x. 1910, H. Bunting, N. C. Rothschild, ♂ holotype, ♀ paratype.

## GAMBIA

From *Eptesicus rendalli*, P. Rendall, 1 ♂ 1 ♀ (Brit. Mus. 1911.103).

## SIERRA LEONE

Njala, from bat, 2.iv. 1925, E. Hargreaves, Imp. Inst. Entomology, 2 ♂ 1 ♀.  
Njala, from *Pipistrellus stampflii*, 10.ix. 1926, E. Hargreaves, H. Scott, 1 ♂.

## DAHOMY

Porto Novo, from *Pipistrellus nanus*, 3 ♀, Mammal dept. (Brit. Mus. 1911.103).

## GOLD COAST

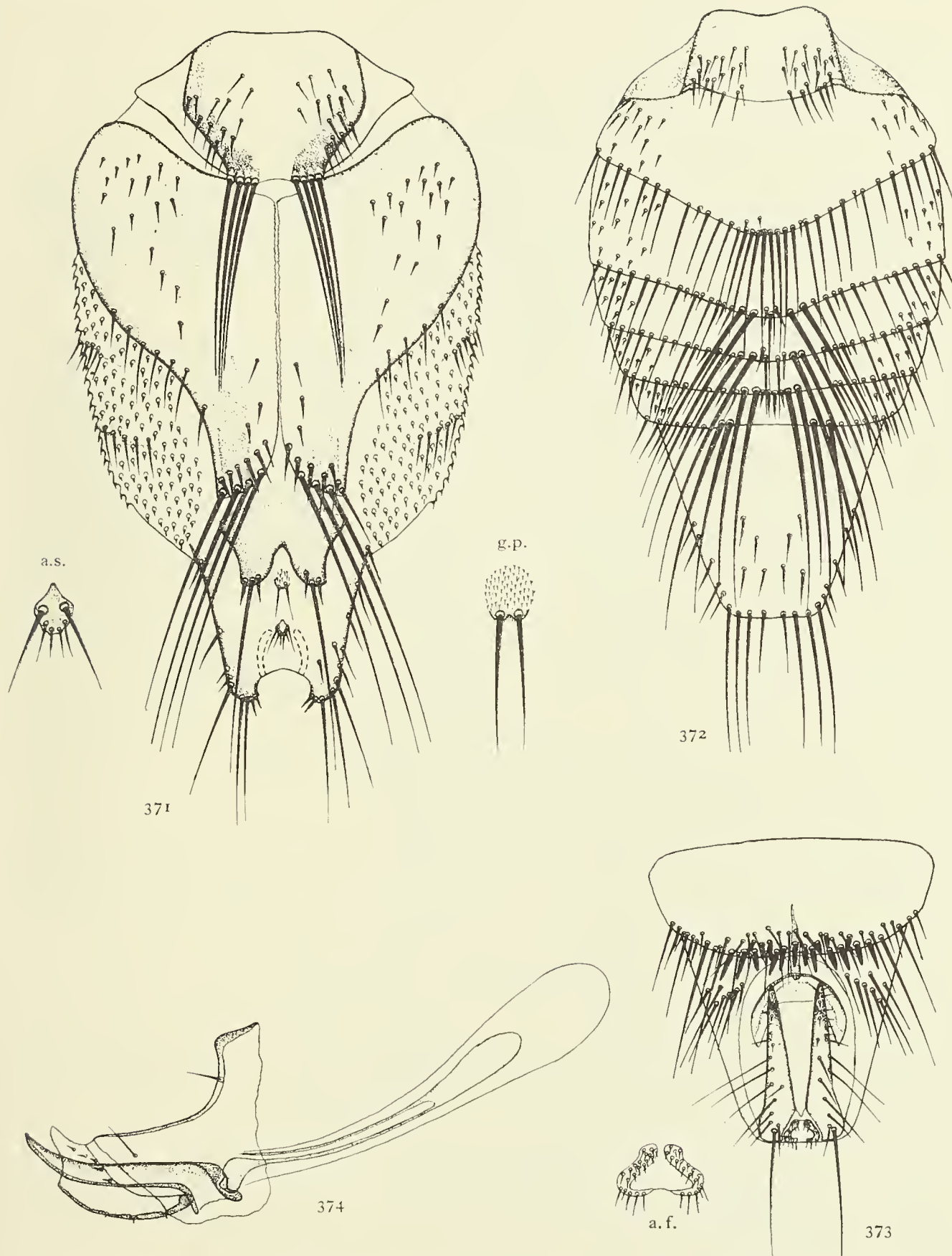
Bawku, Northern Territ., from *Scotophilus* sp., 22.vii. 1939, G. S. Cansdale, 2 ♀ (Brit. Mus. 1940.58).

## NIGERIA

Ibadan, 4.iv. 1915, A. W. J. Pomeroy, Imp. Inst. Entomology, 1 ♀ (Brit. Mus. 1921.466).  
Ibadan, from *Pipistrellus culex*, 2.i. 1926, O. B. Lean, H. Scott, 1 ♂ 2 ♀.

## SUDAN

Gondokoro, near Rejaf, Juba, White Nile, from *Eptesicus rendalli*, M. Sasse, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).  
Torit, Equatoria, from *Pipistrellus* sp. no. 1987 and 2010, 26.v. and 10.vi. 1951, P. Owen, 2 ♀ (Brit. Mus. 1955.594).  
Torit, Equatoria, from *Pipistrellus helios*, 24.vi. 1951, P. Owen, 1 ♂ 1 ♀ (Brit. Mus. 1955.594).



Figs. 371-374. *Basilia ansifera* Theodor. 371. female abdomen, dorsal, with anal sclerite and genital plate; 372. male abdomen, dorsal; 373. male sternite 5 and genital area, with anal frame; 374. male genitalia.



## HOST SYNONYMY

Name on original label  
*Pipistrellus minusculus* Miller.

Current name  
*P. stampflii* (Jentink).

***Basilia bathybothyra* Speiser, 1907**

*Basilia bathybothyra*. Speiser, 1907, *Rec. Ind. Mus.* **1**, 295.

*Penicillidia bathybothyra* (Speiser). Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (refers to *Basilia pumila* Scott).

*Penicillidia bathybothyra* (Speiser). Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479 (refers to *Basilia pumila*).

*Penicillidia bathybothyra* (Speiser). Bequaert, 1933-35, *Parc Albert, Mission de Witte*, fasc. 79, 89 (record from Cyprus refers to *B. daganiae*, African records to *B. ansifera*).

*Basilia bathybothyra* Speiser. Theodor, 1956, *Parasitology*, **46**, 353.

Speiser described this species from a single male from Calcutta, found on *Myotis mystacinus muricola*. The type is lost. Scott (1914) described *Penicillidia fletcheri* var. *pumila* from Ceylon which he later considered synonymous with *Basilia bathybothyra*. *Basilia pumila*, however, is a separate species. The description of *Basilia bathybothyra* is insufficient for the recognition of the species. It may be any of the 5 or 6 species of the group described now from India.

The name *Basilia bathybothyra* will therefore be considered for the present to apply to Speiser's specimen only and identification with any of the other species of the group will have to be deferred until more material from Calcutta and from *Myotis mystacinus muricola* is available.

## HOST SYNONYMY

Name on original label  
*Myotis muricola* Gray.

Current name  
*Myotis mystacinus muricola* Gray.

***Basilia daganiae* Theodor & Moscona, 1954**

(Figs. 375-381)

*Basilia bathybothyra daganiae*. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.

*Basilia bathybothyra daganiae* Theodor & Moscona. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 29.

*Penicillidia bathybothyra* Speiser. Bequaert, 1933-35, *Parc Albert, Mission de Witte*, fasc. 79, 89 (Cyprus record).

*Basilia daganiae* Theodor & Moscona. Theodor, 1956, *Parasitology*, **46**, 353.

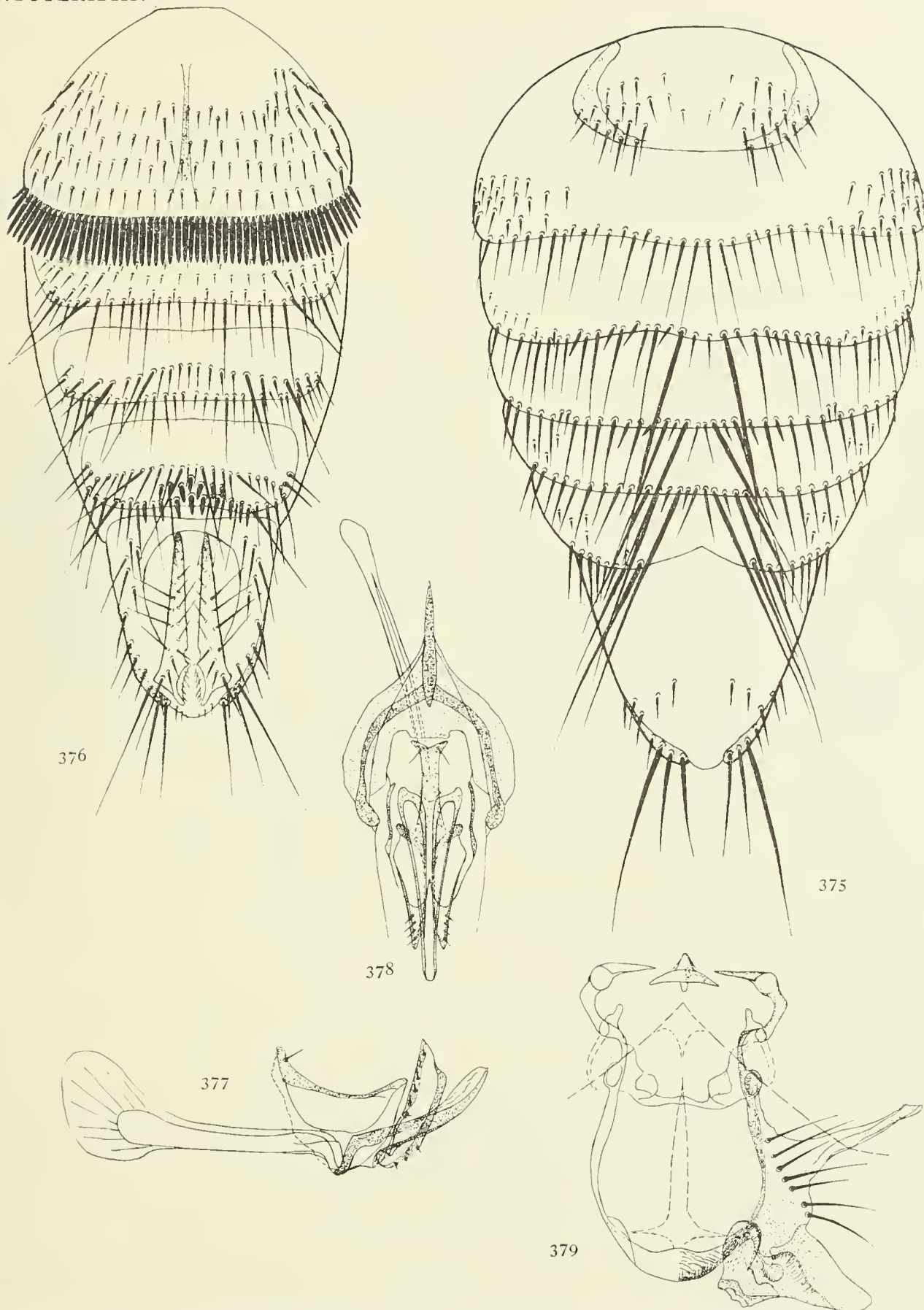
*Basilia daganiae* Theodor & Moscona. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.5 mm. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis one-third of the length of the theca.

*Thorax*. Wider than long. Angle of oblique sutures about 100°. 7-9 notopleural setae. Tibiae 4.5 times as long as wide.

*Male abdomen*. Tergite 2 with a marginal row of moderately long setae. Tergites 3-6 with similar marginal rows, but with 2-4 very long setae in the middle. A gap in the middle of the marginal row of tergite 6. Surface of the tergites bare except for some short hairs in the lateral parts. Anal segment conical, as long as the preceding 2 or 3 tergites. Sternite 1 + 2 with a ctenidium of 60 long spines. Sternite 5 with a group of 15-18 spines in 2 rows.

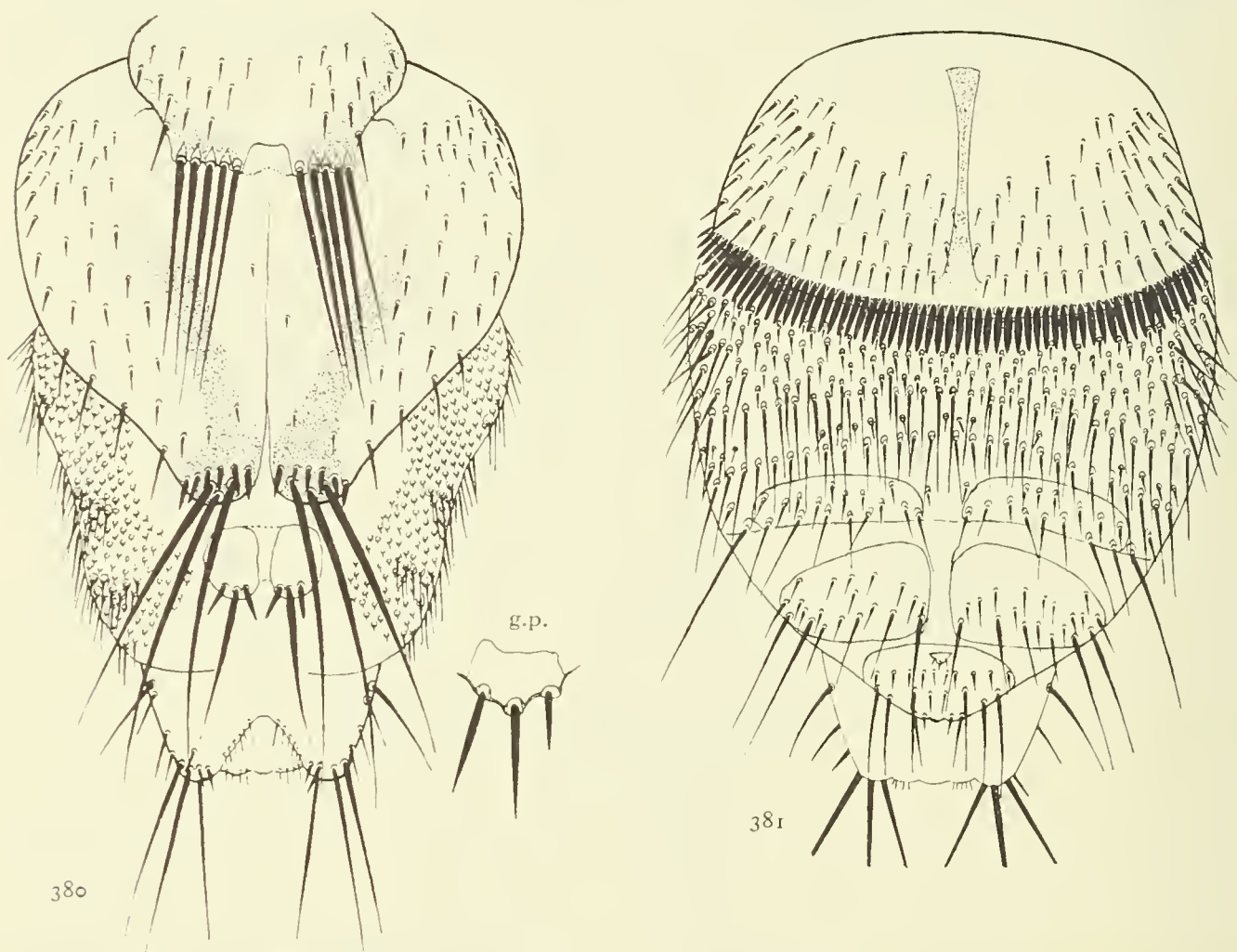
*Genitalia*. Basal arc rounded, with a long anterior process. Claspers short, slightly curved.



Figs. 375-379. *Basilia daganiae* Theodor & Moscona. Male. 375. abdomen, dorsal; 376. same, ventral; 377. genitalia, profile; 378. same, dorsal; 379. dorsal pattern of thorax.

Aedeagus curved, tapering to a short point. Parameres with short triangular end with a sharp point.

*Female abdomen.* Tergite 1 with 2 posterior processes, each with 3–5 very long, closely placed setae. Tergal plate 2 heart-shaped, divided in the middle, with 2 rounded processes which bear 3 long setae and 5–8 spines. Tergal plate 3 with 2 rounded processes, each with a seta and 2 spines. A pigmented stripe runs from the posterior processes of tergal plate 2 into the middle



Figs. 380, 381. *Basilia daganiae* Theodor & Moscona. Female. 380. abdomen, dorsal, with genital plate; 381. same ventral.

of each half. Lateral parts of the plate with short hairs, only a few in the middle. Anal segment short, slightly conical, with a few setae posteriorly and laterally. Pleurae covered with very short spines on raised tubercles. Abdominal ctenidium with about 65 spines. Sternite 5 divided into narrow lateral sclerites. Sternite 6 with larger, triangular plates, sternite 7 triangular or rounded posteriorly. Genital plate small, with 2 or 3 short hairs. Anal sclerite absent or represented by one or two isolated setae.

Distribution and hosts: Cyprus, Southern Turkey, Syria, Israel, Egypt, ? Kenya, mainly on species of *Pipistrellus*.

Type series in the Department of Parasitology, Hebrew University, Jerusalem.



MATERIAL IN THE COLLECTION

CYPRUS	ISRAEL
From <i>Pipistrellus kuhli</i> , Lord Lilford, 1 ♂ (Brit. Mus. 1913.450).	Deganya near Lake Tiberias, from <i>Pipistrellus kuhli</i> , Y. Palmoni, O. Theodor, 1 ♂ 1 ♀, paratypes.
TURKEY	KENYA
Adana, Jan. 1907, 1 ♂. B. M. Bojadjian, N. C. Rothschild.	Mombasa, from <i>Megaderma cor</i> , D. C. Wilson, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).

HOST SYNONYMY

Name on original label	Current name
<i>Cardioderma cor</i> Peters.	<i>Megaderma cor</i> Peters.

***Basilia fletcheri* (Scott, 1914)**

(Figs. 382–386)

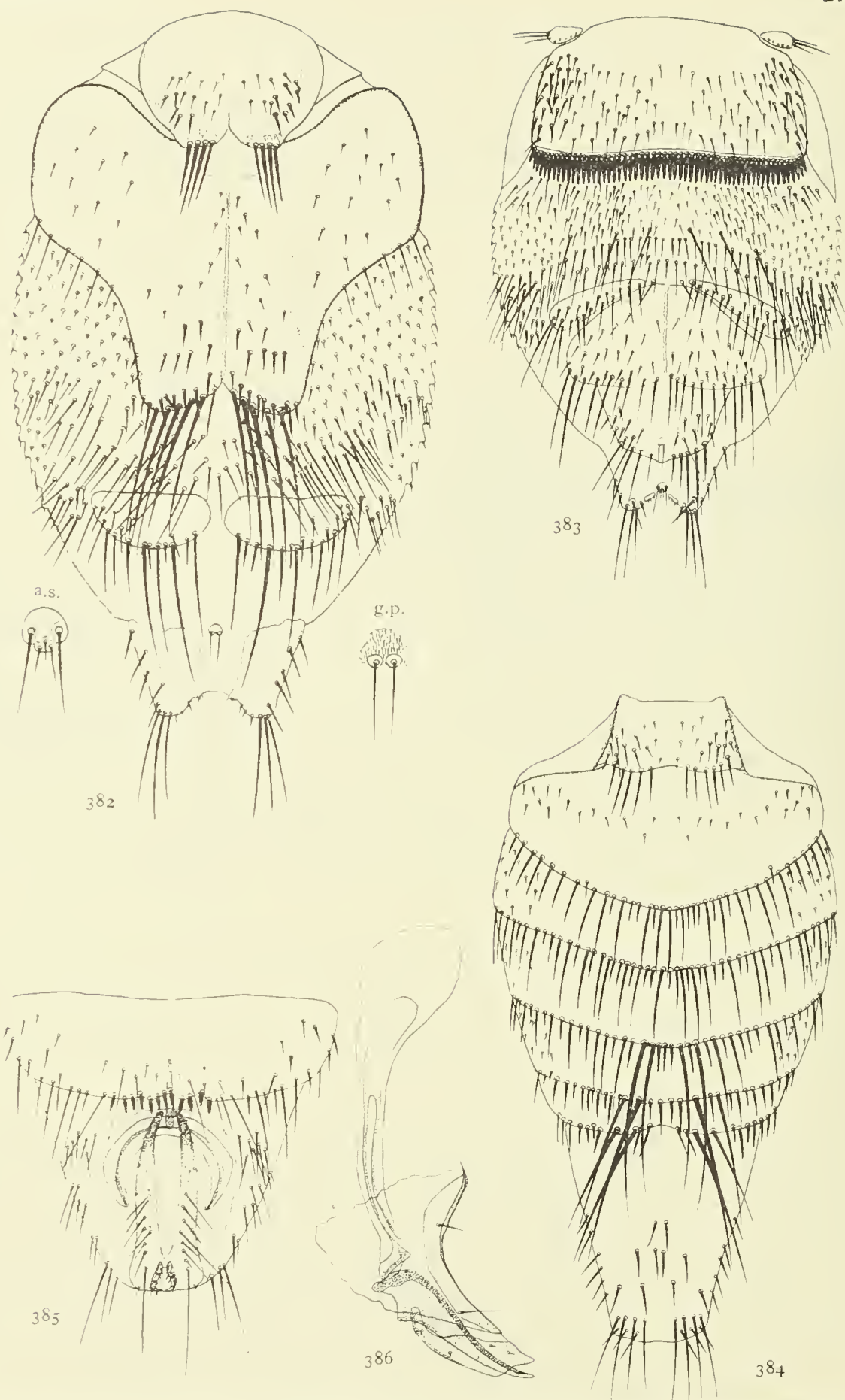
- Penicillidia fletcheri*. Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209.  
*Penicillidia fletcheri*. Scott, 1917, *Parasitology*, **9**, 593.  
*Penicillidia fletcheri*. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.  
*Penicillidia fletcheri* Scott. Hiregaudard & Bal, 1956, *Agra Univ. Jour. Res. (Science)* **5**, 1.  
*Basilia fletcheri* Scott. Theodor, 1956, *Parasitology*, **46**, 353.

Length 2.5 mm. Colour yellowish brown. Head as in *B. pumila*. Labella of the proboscis very short, about one-third of the length of the theca. Eyes with wide pigmented base and lenses not clearly divided. Thorax and legs also as in *B. pumila*.

**Male abdomen.** Tergite 1 with short setae posteriorly with a gap in the middle. Tergite 2 uniformly rounded posteriorly, not triangularly produced in the middle. The marginal setae are uniformly spaced and alternate with short spines. The median setae are not much longer than the lateral ones. A transverse row of short spines, which is double laterally, on the surface. Tergites 3–6 short, with marginal rows of moderately long setae alternating with short spines, bare on the surface except for some minute spines at the sides. 2–4 very long setae in the marginal rows of tergites 4–6 and a gap in the marginal row of tergite 6. Sternite 5 with an irregular row of 9–12 spines at the posterior margin.

**Genitalia.** Claspers long and thin, slightly curved. Basal arc rounded, with long anterior process. Phallobase concave dorsally with 2 setae near the base and 2 setae further apically. Aedeagus broad at the base, slightly curved, tapering to a long point. Apodeme with moderately wide end-plate. Parameres rather short, with a sharp point distally and an obtuse ventral angle. A row of minute hairs along the dorsal edge.

**Female abdomen.** Tergite 1 with 2 groups of 4 short, thick setae posteriorly and an indentation between them. Tergal plate 2 short, heart-shaped, with broad posterior processes which bear 5–6 long, thick setae, which are about 3 times as long as those of tergite 1. A row of 8–10 short spines near the base of the long setae. 5–6 short setae at the oblique lateral margins. Short setae in the anterior lateral parts of the surface, along the median line, and longer spines posteriorly. A pigmented stripe runs from the posterior processes into the middle of each half of the tergal plate. Tergal plate 3 divided into transversely elliptical plates which bear about 4 long setae posteriorly towards the middle and shorter setae between them and towards the sides. The connexivum between tergal plate 2 and 3 is densely covered with moderately long



Figs. 382-386. *Basilia fletcheri* (Scott). 382. female abdomen, dorsal, with anal sclerite and genital plate; 383. same, ventral; 384. male abdomen, dorsal; 385. male sternite 5 and genital area; 386. male genitalia.

setae. The minute spines on the pleurae are longer and thinner than in other species. Behind tergal plate 3 the dorsum is bare. Anal segment very short, bare dorsally and with 1–2 setae at the sides. 3–4 long setae at the anal processes. Sternite 1 + 2 with a ctenidium of about 70 spines. Sternite 5 with 2 narrow sclerites which are placed obliquely and do not reach the midline. 2 setae between the sclerites. Sternite 6 divided into broad, triangular sclerites which reach the median line. Sternite 7 rounded posteriorly with long setae posteriorly and short setae on the surface. Anal sclerite small, rounded, with 2 longer setae in the middle and 2–3 short setae posteriorly. Genital plate small, rounded, with minute spines and 2 setae.

## MATERIAL IN THE COLLECTION

## INDIA

Coimbatore, Madras, from *Pipistrellus dormeri*, 24.i. 1913, T. B. Fletcher, N. C. Rothschild, ♂ holotype, ♀ paratype.

Navapur near Bombay, from *Pipistrellus dormeri*, 8.v. 1900, N. C. Rothschild, 1 ♂ 1 ♀.

Astoli, Bolgaum, Bombay, from *Tylonycteris pachypus*, R. E. Wroughton, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).

The specimen from Bangalore mentioned by Scott (1917) belongs to *B. punctata*.

***Basilias majuscula* (Edwards, 1919)**

(Figs. 387–390)

*Penicillidia fletcheri* var. *majuscula*. Edwards, 1919, *Jour. Fed. Malay States Mus.* 8, 7.

*Penicillidia longiseta*. Schuurmans Stekhoven & Hardenberg, 1938, *Capit. Zool.* 8, 1.

*Basilias longiseta* Schuurmans Stekhoven & Hardenberg. Schuurmans Stekhoven, 1942, *Zeitschr. f. Parasitenk.* 12, 507.

*Basilias rotundisquamata*. Schuurmans Stekhoven, 1942, *Zeitschr. f. Parasitenk.* 12, 507.

*Basilias scotti*. Hiregaudar & Bal, 1956, *Agra Univ. Jour. Res. (Science)*, 5, 1.

*Basilias majuscula* (Edwards). Theodor, 1956, *Parasitology*, 46, 353.

*Basilias majuscula* (Edwards). Theodor, 1963, *Fieldiana, Zoology*, 42, 151.

Length 2.2–2.5 mm. Colour light brown. Head with 6–8 setae at the anterior dorsal margin. Eyes with small, well-marked lenses. Labella of the proboscis about half the length of the theca.

*Thorax*. Wider than long. Length to width = 5 : 6. Otherwise similar to *B. pumila*.

*Male abdomen*. Tergite 2 triangularly produced in the middle of the posterior margin. 6–8 long setae at the apex. Laterally the setae are shorter and more widely spaced and alternate with spines. Surface bare except for a group of spines in the lateral corners. Tergites 3–6 short, with marginal rows of moderately long setae alternating with spines in the middle and 2–4 very long setae in the marginal rows of tergites 4–6. A wide gap in the middle of the marginal row of tergite 6. Surface bare except for groups of 8–12 spines in the lateral corners of tergites 3–5. Anal segment long, narrowly conical, with a few spines dorsally and longer setae posteriorly. Sternite 5 with an irregular row of 9–12 spines at the posterior margin.

*Genitalia*. Claspers long and thin, pigmented. Basal arc narrow, rounded, with a long anterior process. Phallobase strongly concave dorsally, with 2 setae near the base and 2 more apically. Aedeagus long, slightly curved, tapering to a point. Apodeme with a wide end-plate. Parameres long, narrow, curved ventrally, with short and blunt apical end and a row of about 6 minute hairs along the dorsal edge.

*Female abdomen*. The posterior lobes of tergite 1 bear 3–6 long and thick setae. Tergal plate 2



rather short, heart-shaped, with broadly rounded posterior processes, which bear 3 or 4 very long and thick setae, not much longer than those of tergite I, and a row of 6-7 spines. 4-5 short setae at the oblique lateral margins. Short spines on the surface laterally and posteriorly, the posterior spines being longer. Pigmented stripes run from the posterior processes to the anterior margin of the sclerite. Tergal plate 3 with short and rounded posterior processes with

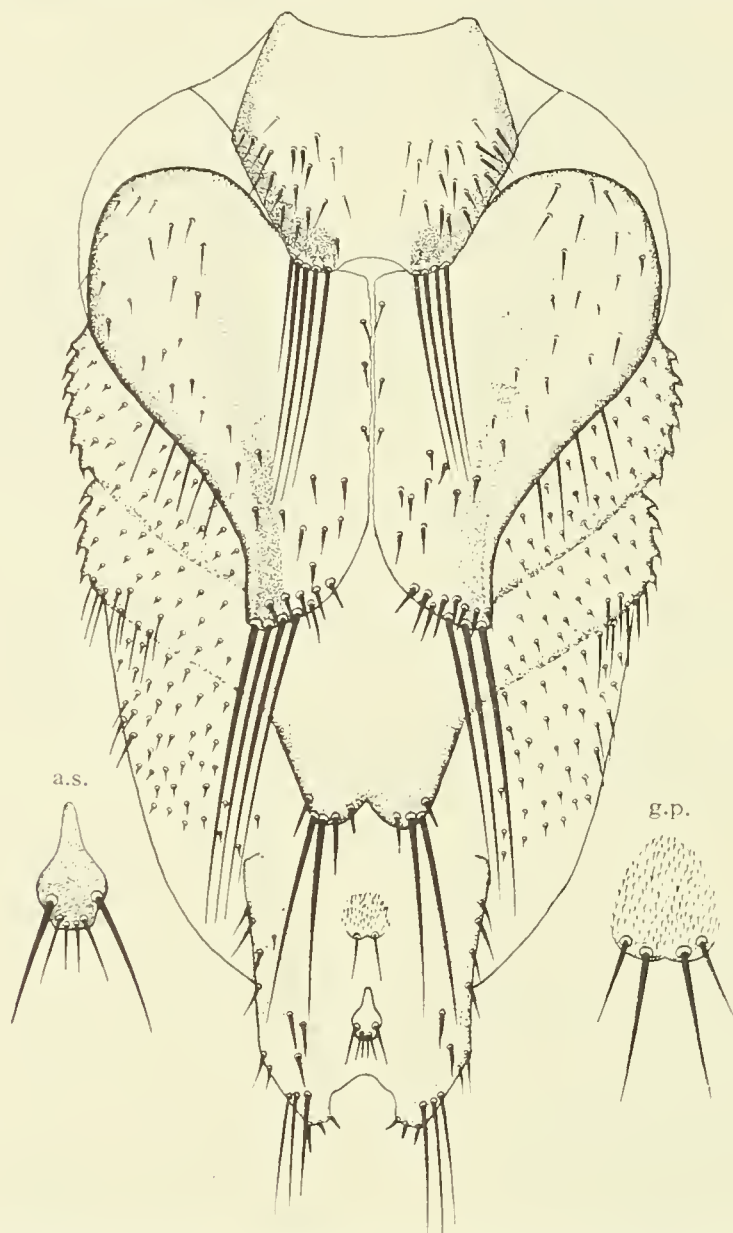
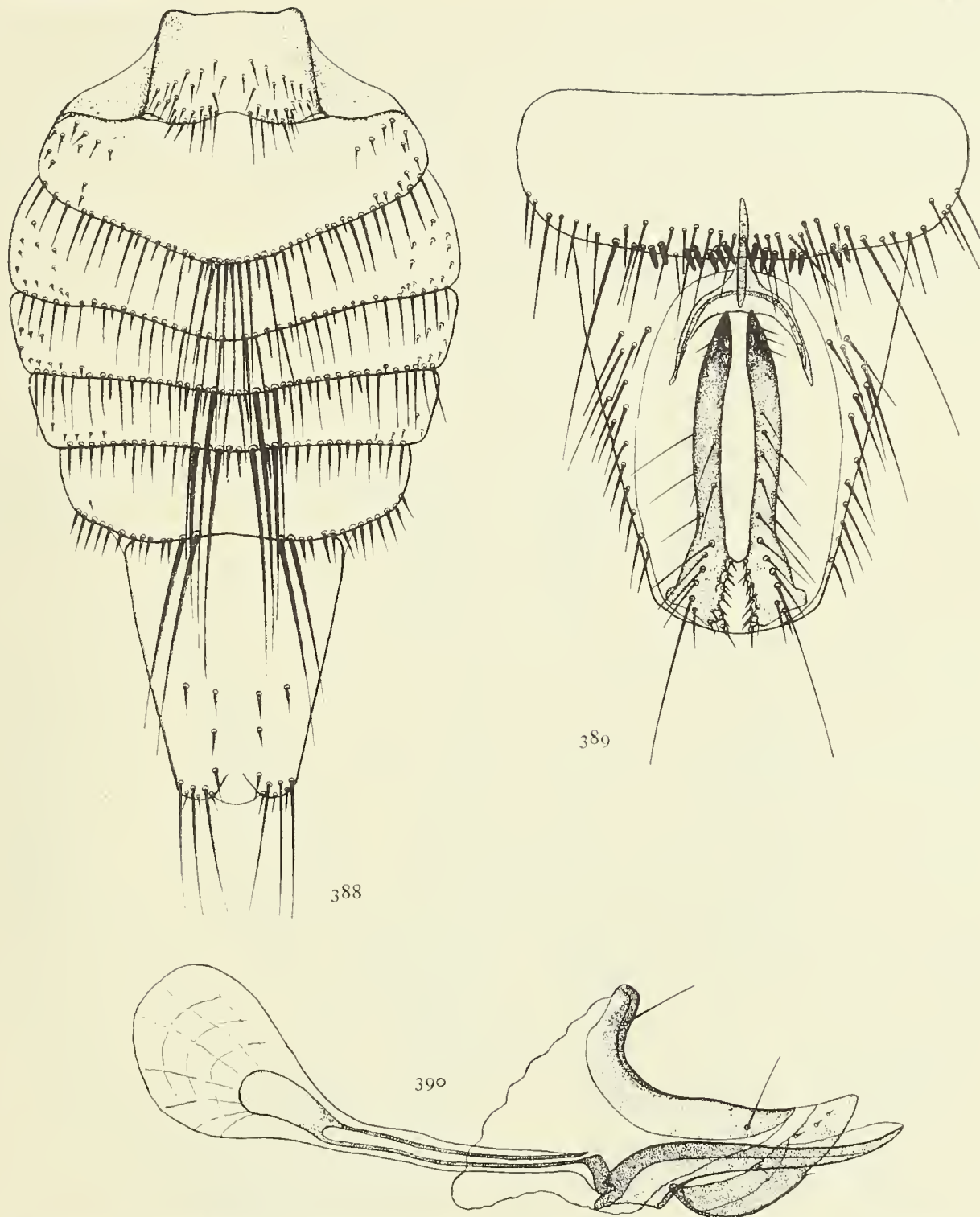


Fig. 387. *Basilia majuscula* (Edwards). Female, abdomen, dorsal, with anal sclerite and genital plate.

2 long setae and 2-3 spines. Anal segment long, nearly parallel-sided, with long anal processes, bare dorsally, except for a few setae and with short setae along the sides. There are some long setae and a few spines at the anal processes. Abdominal ctenidium with 65-75 spines. Anal sclerite drop-shaped, with an anterior process. Genital plate rounded, with minute spines and 3-5 setae posteriorly.

Distribution: Java, Sumatra, India, Palawan (Philippines).



Figs. 388-390. *Basilia majuscula* (Edwards). Male. 388. abdomen, dorsal; 389. sternite 5 and genital area; 390. genitalia.

MATERIAL IN THE COLLECTION

SUMATRA

Mt Korinchi, Sungei Penoh, from *Vespertilio* sp., 12.iii. 1914, H. C. Robinson & C. Boden Kloss, ♀ holotype and 2 ♂ 4 ♀ paratypes (Brit. Mus. 1915.182).

Jakarta (Batavia), Bogor (Buitenzorg), from *Tylonycteris pachypus*, W. E. Balston, G. C. Shortridge, N. C. Rothschild, 3 ♀ (Brit. Mus. 1913.450).

JAVA

West Java, from *Pipistrellus javanicus javanicus*, G. C. Shortridge, N. C. Rothschild, 1 ♂ 4 ♀ (Brit. Mus. 1913.450).

INDIA

Khandala, Bombay, Assmuth, H. Scott, 1 ♀.

PHILIPPINES

OTHER MATERIAL EXAMINED

Palawan, from *Pipistrellus imbricatus*.

HOST SYNONYMY

Name on original label

Current name

*Pipistrellus tralatitius* Thomas.

*P. javanicus javanicus* Gray.

***Basilias meridionalis*** Theodor, 1956

(Fig. 391)

*Basilias meridionalis*. Theodor, 1956, *Parasitology*, **46**, 353.

*Basilias meridionalis* Theodor. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.5 mm. Colour brown, strongly sclerotized.

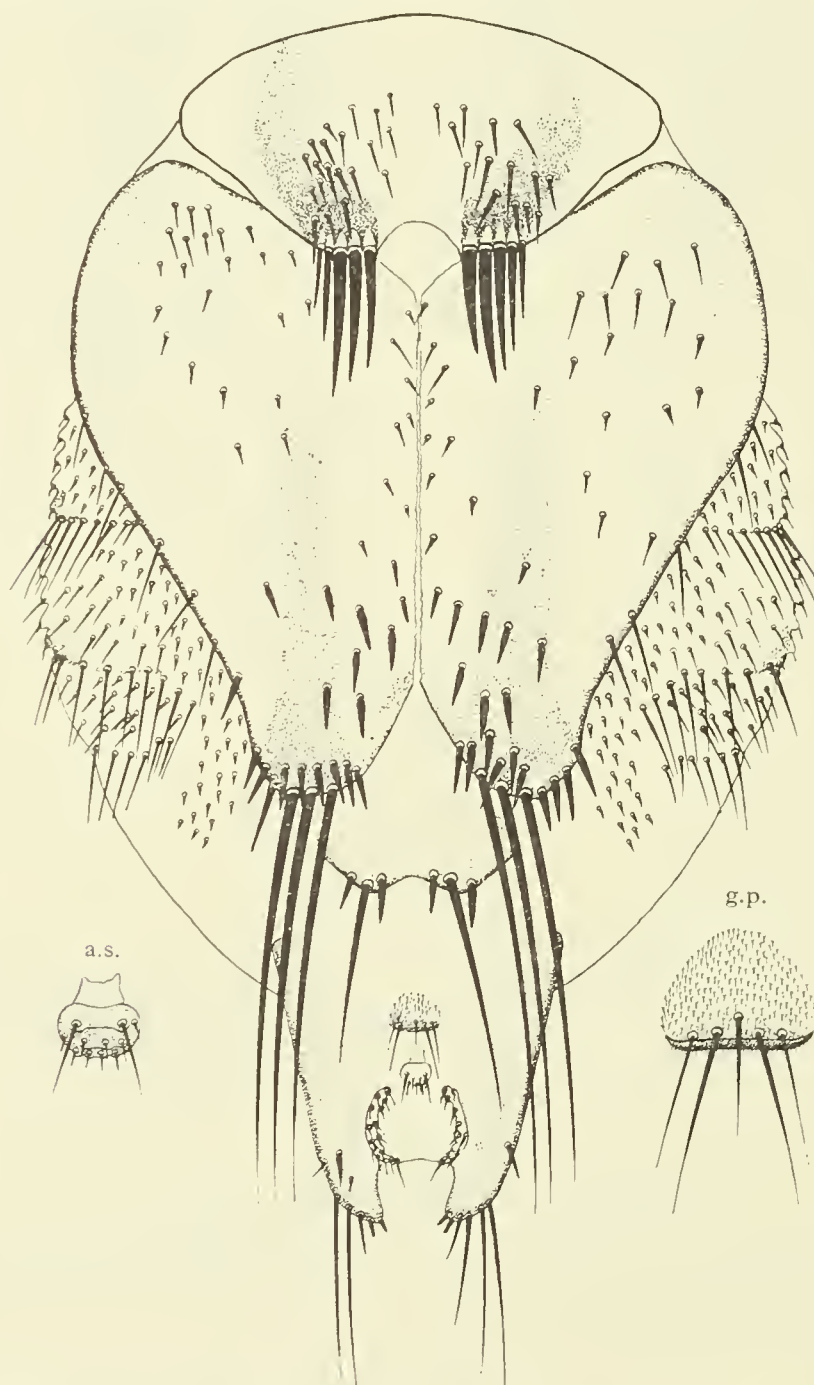


Fig. 391. *Basilias meridionalis* Theodor. Female abdomen, dorsal, with anal sclerite and genital plate.



*Female abdomen.* The posterior setae of tergite 1 are very short and thick, about one-third of the length of the long setae of tergal plate 2. Posterior processes of tergal plate 2 broad, rounded, with 3 very long setae and about 10 spines. Tergal plate 3 with short and broad posterior processes with a long seta and 2 spines. Anal segment longer than wide, bare dorsally and laterally except for 1–2 short spines near the anal processes. Anal sclerite broad, with 2 longer and 7–8 short setae posteriorly. Genital plate with 2 longer and 3 shorter setae.

Male unknown.

Distribution: South Africa, without exact locality and host, ♀ holotype. Department of Parasitology, Hebrew University, Jerusalem.

***Basilia pumila* (Scott, 1914)**

(Figs. 392–395)

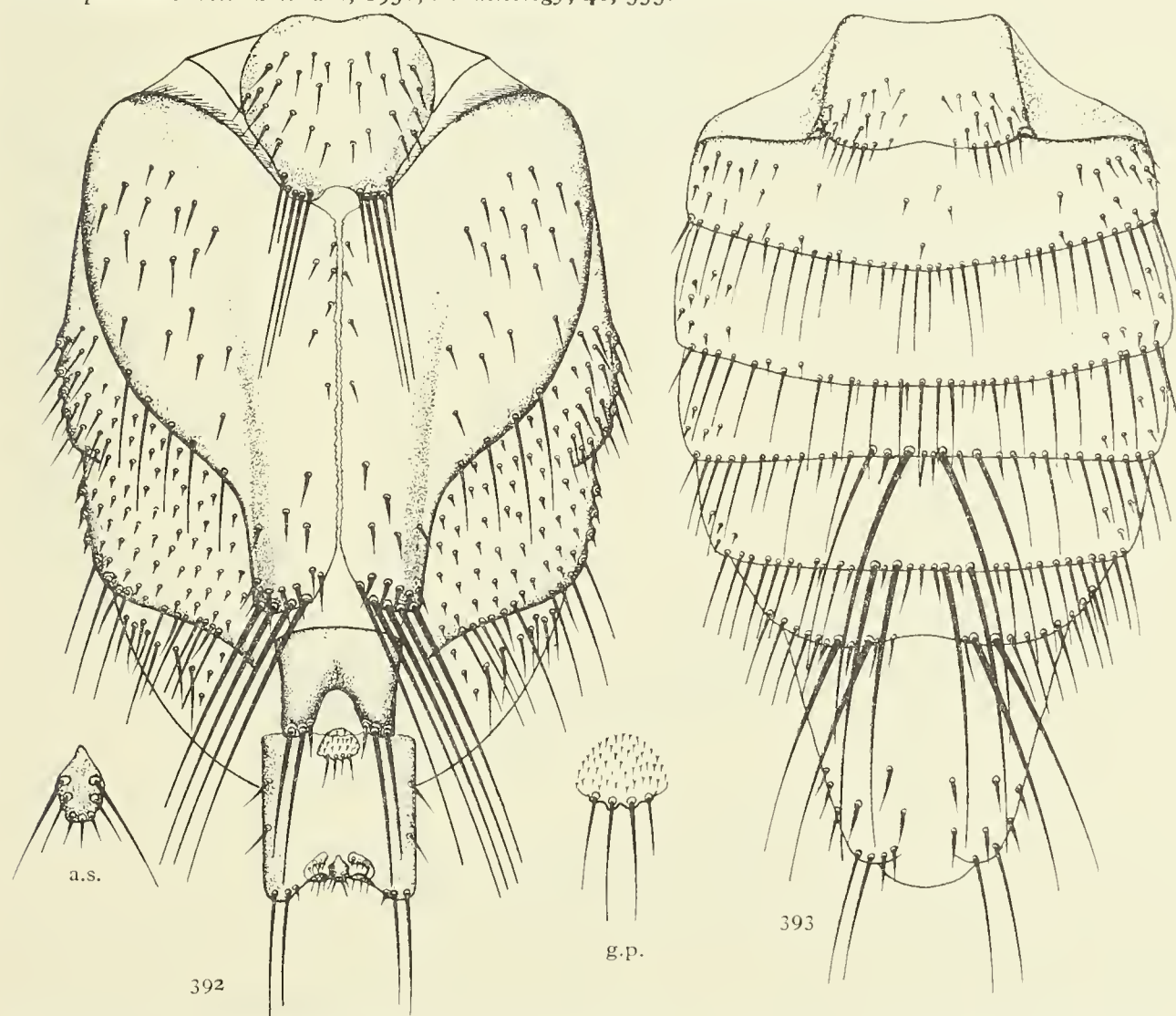
*Penicillidia fletcheri* var. *pumila*. Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209.

*Penicillidia fletcheri* var. *pumila* Scott. Scott, 1917, *Parasitology*, **9**, 593.

*Penicillidia bathybothyra* Speiser. Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (Ceylon records).

*Penicillidia bombayensis*. Hiregaudar & Bal, 1956, *Agra Univ. Jour. Res. (Science)*, **5**, 1.

*Basilia pumila* Scott. Theodor, 1956, *Parasitology*, **46**, 353.

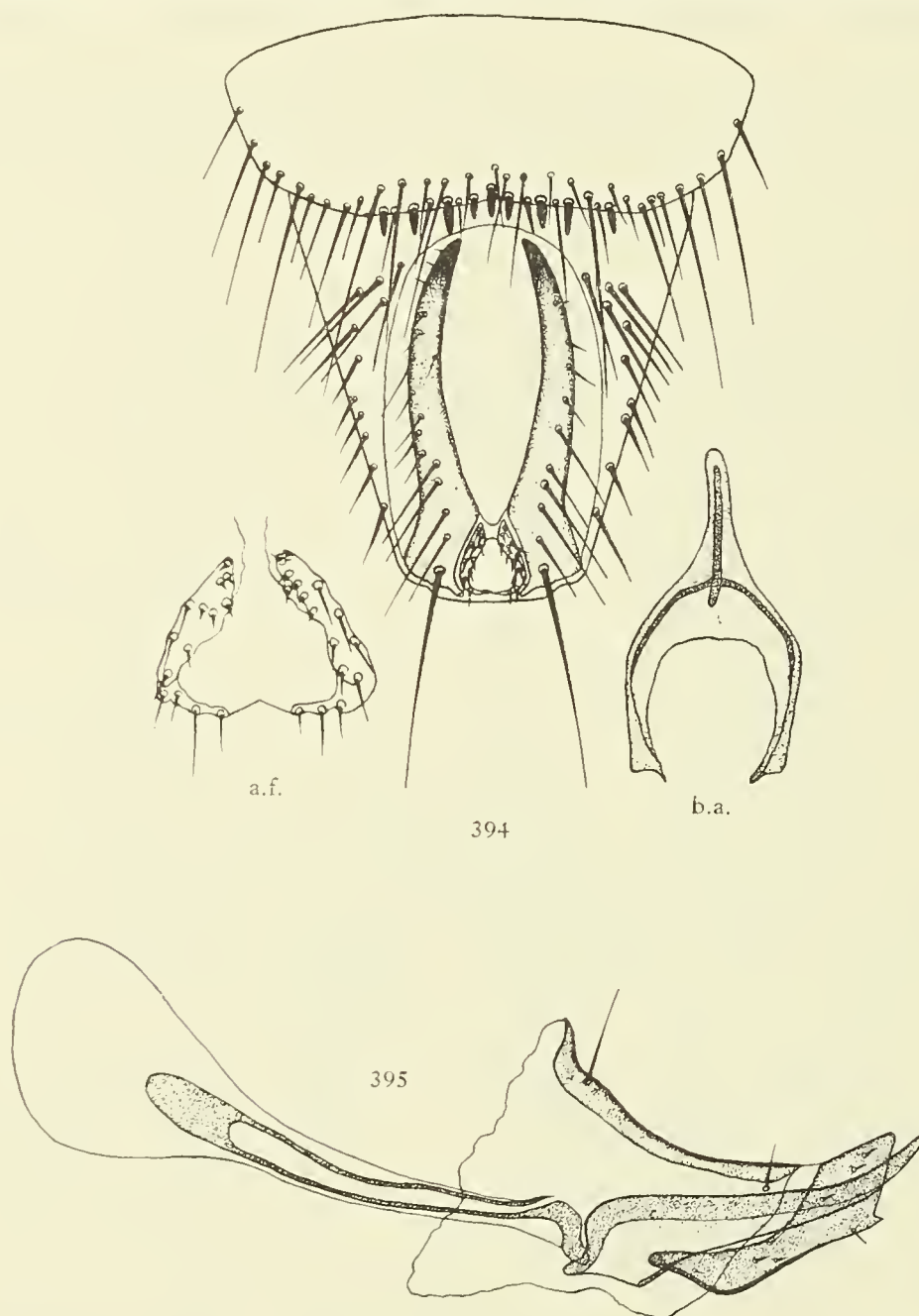


Figs. 392, 393. *Basilia pumila* (Scott). 392. female abdomen, dorsal, with anal sclerite and genital plate; 393. male abdomen, dorsal.

Length 1.5–1.8 mm. Colour yellowish.

*Head.* 4 setae at the anterior dorsal margin and 2 between the eyes. These are nearly spherical and the lenses are often not clearly separated or there may be only a single lens on one or both sides. Labella of the proboscis about half as long as the theca.

*Thorax.* Wider than long. Length to width = 4 : 5. Angle of oblique sutures  $95^{\circ}$ . Lateral



Figs. 394, 395. *Basilia pumila* (Scott). Male. 394. sternite 5 and genital area, with anal frame and basal arc; 395. genitalia.

plates of the notopleural sutures wide, with 6–9 notopleural setae. Tibiae 4 times as long as wide.

*Male abdomen.* Tergite 2 with a marginal row of moderately long, equally spaced setae alternating with spines. A few short hairs in the lateral parts of the surface and in the middle.

Tergites 3–6 narrow with similar marginal rows and with 4 long and thick setae in the marginal rows of tergites 4–6. Surface bare except for a few minute spines in the lateral corners. A gap in the marginal row of tergite 6. Anal segment short, conical, with 2–3 setae posteriorly and a few short setae on the dorsum. Sternite 1 + 2 with a ctenidium of about 60 spines. Sternite 5 short, with slightly curved posterior margin and 8–9 short spines at the posterior margin.

*Genitalia.* Claspers thin, slightly curved, with dark tips. Basal arc rounded, narrow, with a long anterior process. Aedeagus broad at the base, tapering to a long point, slightly curved. Apodeme short with a wide end-plate. Parameres with short, triangular apical end, an obtuse ventral angle and 3–4 minute hairs. Phallobase concave dorsally, with 2 setae near the base and two further apically.

*Female abdomen.* Tergite 1 with 2 groups of 3–4 moderately long, thin setae and 1–2 shorter setae. Tergal plate 2 heart-shaped, divided in the middle, with broad posterior processes which bear 4–5 very long and thick setae. These are nearly twice as long and thick as those of tergite 1. Near their base 5–7 short spines. 4–5 moderately long setae along the posterior lateral margins. Short setae in the lateral part of the surface and along the median line. Some longer spines at the base of the posterior processes from which a narrow pigmented stripe runs into each half of the plate. Tergal plate 3 with 2 long processes which bear 2 long setae and a short spine. Anal segment short, parallel-sided, with 2 or 3 short setae laterally and 2 long setae and some spines at the anal processes. Sternite 1 + 2 with a ctenidium of about 60 spines. Sternite 5 with narrowly elliptical lateral sclerites which do not quite reach the midline. They have marginal rows of moderately long setae and longer lateral setae. Sternite 6 with broader, rectangular sclerites with similar marginal rows. Sternite 7 trapezoidal or rounded posteriorly. Genital plate small, rounded, with 4–6 setae posteriorly.

Distribution: Ceylon, India. Scott's record from Khandala, Bombay (1917) refers to *B. majuscula*.

#### MATERIAL IN THE COLLECTION

##### CEYLON

Peradeniya, from *Pipistrellus coromandra*, xi. 1911, J. C. F. Fryer, ♂ holotype, 1 ♂ 2 ♀ paratypes (Brit. Mus. 1914.474).

Anasigalla, Matugama, Kalutara, from *Pipistrellus mimus minus*, 30.vi. 1922, W. W. A. Phillips, 3 ♂ 3 ♀.

Saduganga, Matale, from *Pipistrellus mimus minus*, 2.x. 1924, R. Senior White, 1 ♀.

Kakirawa, N. C. P., from *Pipistrellus coromandra* 16.vii. 1933, W. W. A. Phillips, 1 ♂.

##### INDIA

Madras, from *Pipistrellus coromandra*, J. G. Jerdon, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

Helwak near Bombay, from *Pipistrellus coromandra*, 7.v. 1900, N. C. Rothschild, 1 ♀.

#### HOST SYNONYMY

Name on original label  
*Pipistrellus abramus* Temminck.  
(Records in this area.)

Current name  
*P. coromandra* Gray.

#### ***Basilia punctata* Theodor, 1956**

(Figs. 396, 397)

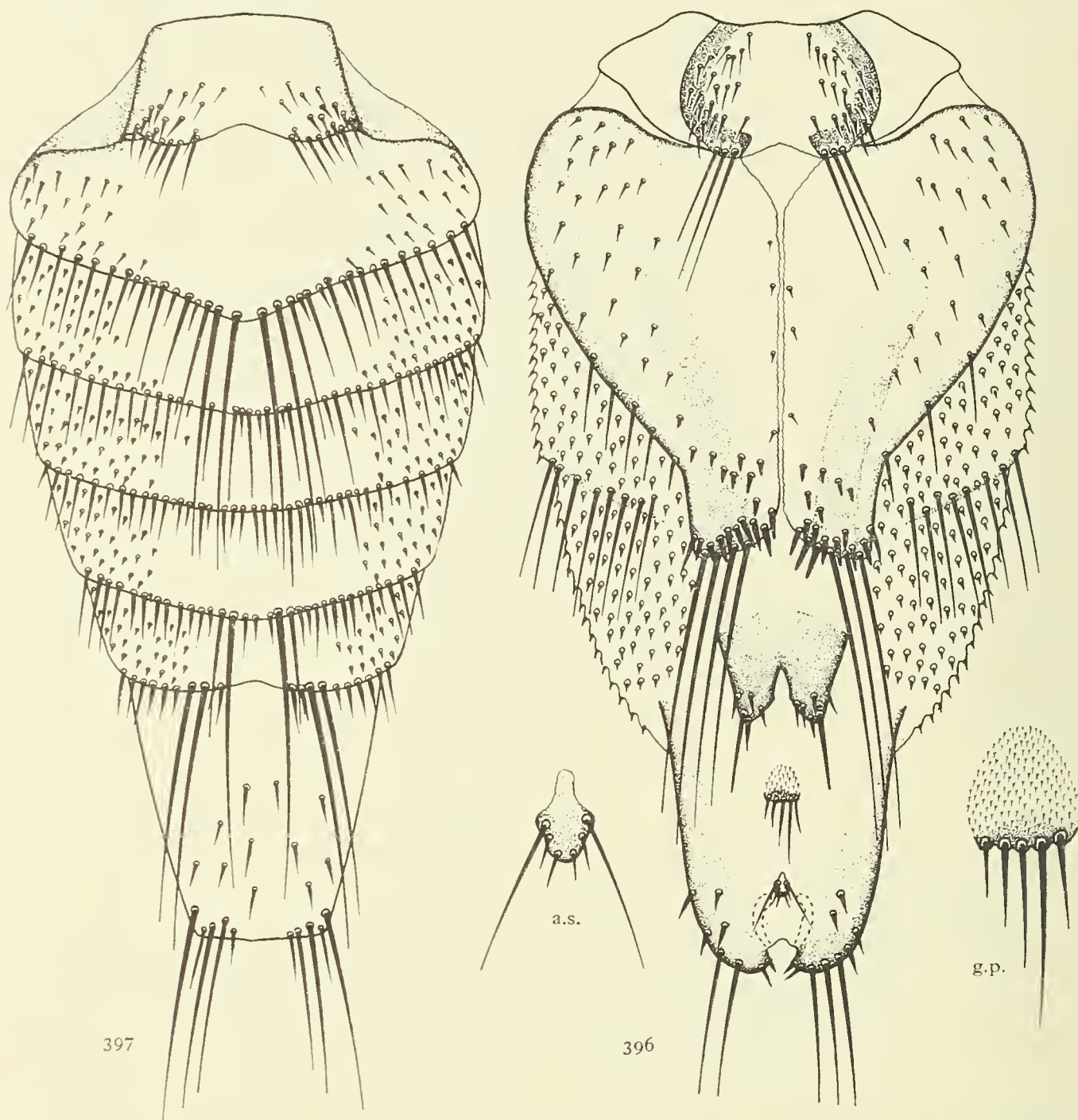
*Basilia punctata.* Theodor, 1956, *Parasitology*, **46**, 353.

Length, colour, head and thorax as in *B. majuscula*.

*Male abdomen.* Tergite 2 even more strongly triangularly produced in the middle of the



posterior margin than in *B. majuscula*. The group of long setae in the middle of the marginal row consists of 4-6 very long and thick setae which are much longer than in *B. majuscula*. Tergites 3-6 with marginal rows of rather short setae and some short spines between them.



Figs. 396, 397. *Basilia punctata* Theodor. 396. female abdomen, dorsal, with anal sclerite and genital plate; 397. male abdomen, dorsal.

2-4 very long setae in the marginal rows of tergites 4-6 or 5-6. The surface of tergites 3-6 is covered with minute thick spines in their lateral thirds or quarters, about 40 in number as against 10-12 in *B. majuscula*. Ventral surface and genitalia as in *B. majuscula*. 9-15 spines in an irregular double row on the posterior margin of sternite 5.

*Female abdomen.* The setae at the posterior margin of tergite 1 are much shorter and thinner and the gap between them is wider than in *B. majuscula*. They are about one-third of the length of the long setae of the posterior processes of tergal plate 2. These are broader than in *B. majuscula* and bear 3–5 very long and thick setae and 7–10 spines. Tergal plate 3 with posterior processes which are longer than in *B. majuscula* and bear only one moderately long seta and several spines. Anal segment bare dorsally and laterally, except for a few spines posteriorly. Ventral surface, anal sclerite and genital plate as in *B. majuscula*.

MATERIAL IN THE COLLECTION

CEYLON

Tonacombe, Namunukula, Uva prov., from *Pipistrellus ceylonicus*, 21.v. 1951, W. W. A. Phillips, ♀ holotype, 1 ♂ 2 ♀ paratypes.  
Ohya, from *Pipistrellus ceylonicus*, 26.ii. 1933, W. W. A. Phillips, 1 ♂ (Brit. Mus. 1933.262).  
Pingarawa Estate, Namunukula, from *Pipistrellus ceylonicus*, 4.xii. 1955, W. W. A. Phillips, 2 ♂ 3 ♀.

Uva Hills, from *Pipistrellus ceylonicus*, 8.iv. 1956, W. W. A. Phillips, 2 ♂ 2 ♀.

INDIA

Bangalore, Mysore, vii. 1916, Assmuth, H. Scott, 1 ♂.

***Basilia robusta* Theodor, 1956**

(Figs. 398–401)

*Basilia robusta.* Theodor, 1956, *Parasitology*, **46**, 353.

*Basilia robusta* Theodor. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.2–2.5 mm. Colour brown, heavily sclerotized.

*Head.* As in *B. ansifera*. Labella of the proboscis about one-third of the length of the theca.

*Thorax.* Markedly wider than long. Length to width = 3 : 4. Angle of the oblique sutures about 100°. 10–12 notopleural setae.

*Male abdomen.* Tergite 2 uniformly rounded posteriorly with a marginal row of equally spaced setae of the same length. Tergites 3–6 very short, with 4 very long setae in the marginal rows. Surface bare except for a few minute spines laterally. Anal segment as long as the preceding 3–4 tergites. Sternite 5 with a double row of 22–27 spines at the posterior margin.

*Genitalia.* Aedeagus nearly straight, tapering to a blunt tip. Parameres with a truncate end.

*Female abdomen.* Tergite 1 with 2 groups of 4–5, rarely 6–7 long setae. Tergal plate 2 with wide truncate posterior processes which bear 4–5 very long and thick setae. The setae of tergite 1 are half as long as those of tergal plate 2 in specimens from Abyssinia and two-thirds of their length in specimens from Uganda and the Congo. Tergal plate 3 with broad processes which bear 1–2 long setae and 1–2 spines. Anal segment longer than wide, bare dorsally and with rather long posterior processes. Sternite 1 + 2 with a ctenidium of 65–70 long spines. Anal sclerite small, of irregular form, with 2 setae in the middle and 4 shorter setae posteriorly. Genital plate with 4 long setae.

MATERIAL IN THE COLLECTION

UGANDA

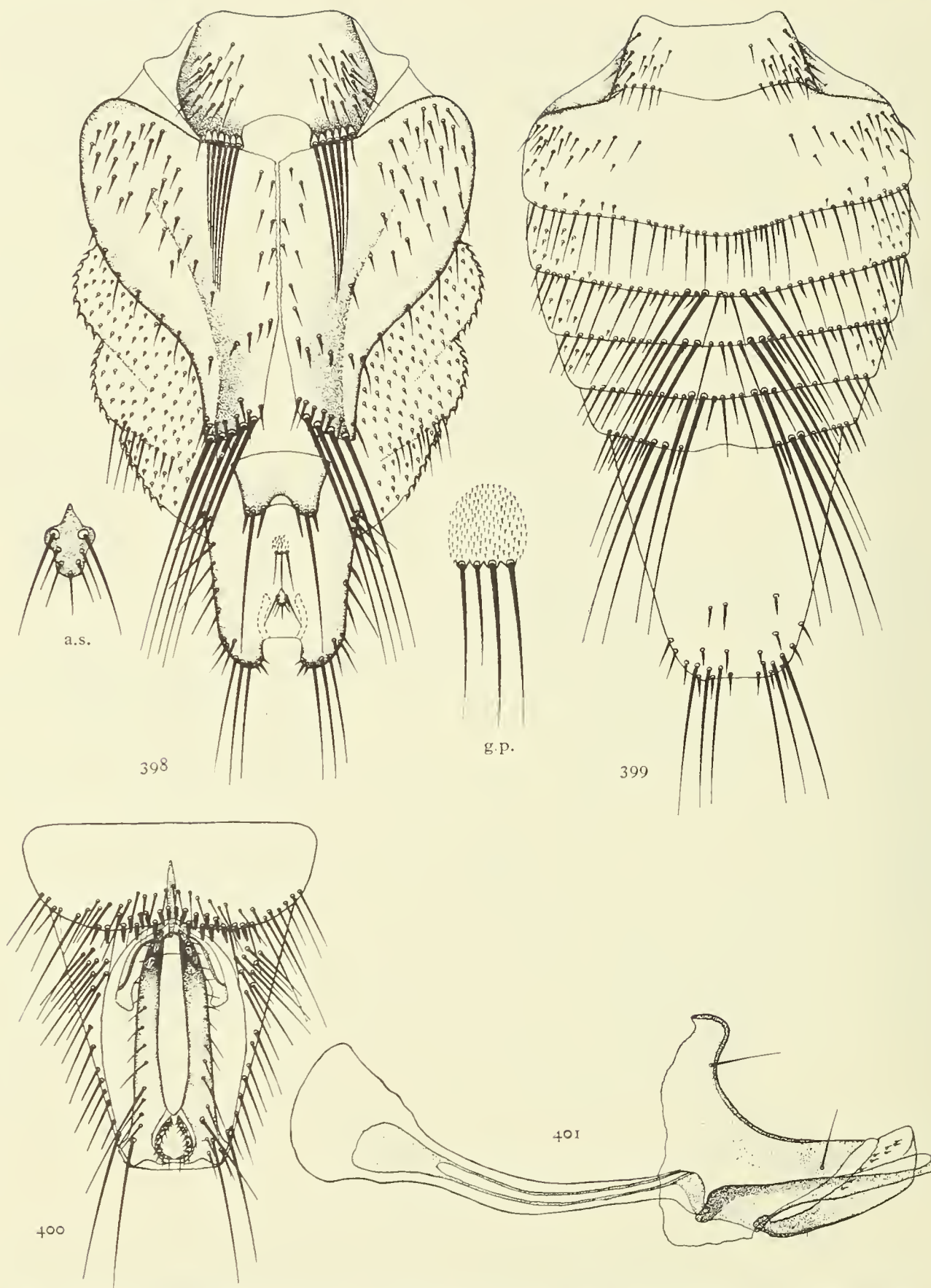
Bubembe Island, Lake Victoria, 9.iv. 1927, C. R. S. Pitman, ♂ holotype, 2 ♂ 7 ♀ paratypes (Brit. Mus. 1927.231).

ABYSSINIA

Harar, from *Pipistrellus nanus*, 1914, G. Kristensen, N. C. Rothschild, 2 ♂ 4 ♀.

SOUTHERN RHODESIA

Odzi district, from *Pipistrellus kuhli*, 19.ii. 1948, N. C. E. Miller, 1 ♂.



Figs. 398-401. *Basilia robusta* Theodor. 398. female abdomen, dorsal, with anal sclerite and genital plate; 399. male abdomen, dorsal; 400. male sternite 5 and genital area; 401. male genitalia.



## OTHER MATERIAL EXAMINED

## CONGO

Uvira, Kivu, from *Eptesicus tenuipinnis*, 2.iii. 1955, N. Leleup, circ. 20 specimens.

***Basiliaseminuda*** Theodor, 1956

(Figs. 402-407)

*Basiliaseminuda*. Theodor, 1956, *Parasitology*, **46**, 353.

Length 2 mm. Colour yellowish.

*Head*. As in *B. pumila*. Eyes shallow, with wide basal opening. Labella of the proboscis about one-quarter of the length of the theca.

*Thorax*. Wider than long. Length to width = 4 : 5. Angle of oblique sutures 90°. 8-9 notopleural sutures.

*Female abdomen*. Tergite 1 with 2 groups of 5-6 long setae with a wide gap between them. Tergal plate 2 heart-shaped, with nearly straight lateral borders which bear a row of about 10 moderately long setae. The posterior processes are broad and bear 4-5 setae which are about as long as those of tergite 1. Near their base a row of 7-8 spines. Short setae in the anterior lateral parts of the surface and along the median line. Tergal plate 3 divided into 2 roughly triangular plates which are widely separated and lie far posteriorly. They bear 3 long setae and some short ones posteriorly and are bare on the surface. Connexivum between tergal plates 2 and 3 bare. Anal segment very short, triangular. Sternite 1 + 2 with a ctenidium of 55 spines. Sternite 5 with narrowly elliptical sclerites which are placed obliquely and do not quite reach the median line. Sternite 6 undivided, broadly triangular, with long setae posteriorly. Sternite 7 broadly rounded, with long and short setae posteriorly. Anal sclerite small, with 2 setae posteriorly. Genital plate convex posteriorly, with about 12 setae posteriorly and some minute hairs.

Male unknown.

## MATERIAL IN THE COLLECTION

## INDIA

Simla, N.W. Himalayas, 17.vi. 1912, P. J. Dodsworth, N. C. Rothschild, ♀ holotype.

*Position uncertain****Basiliatenuispina*** Theodor, 1957

(Figs. 408-410)

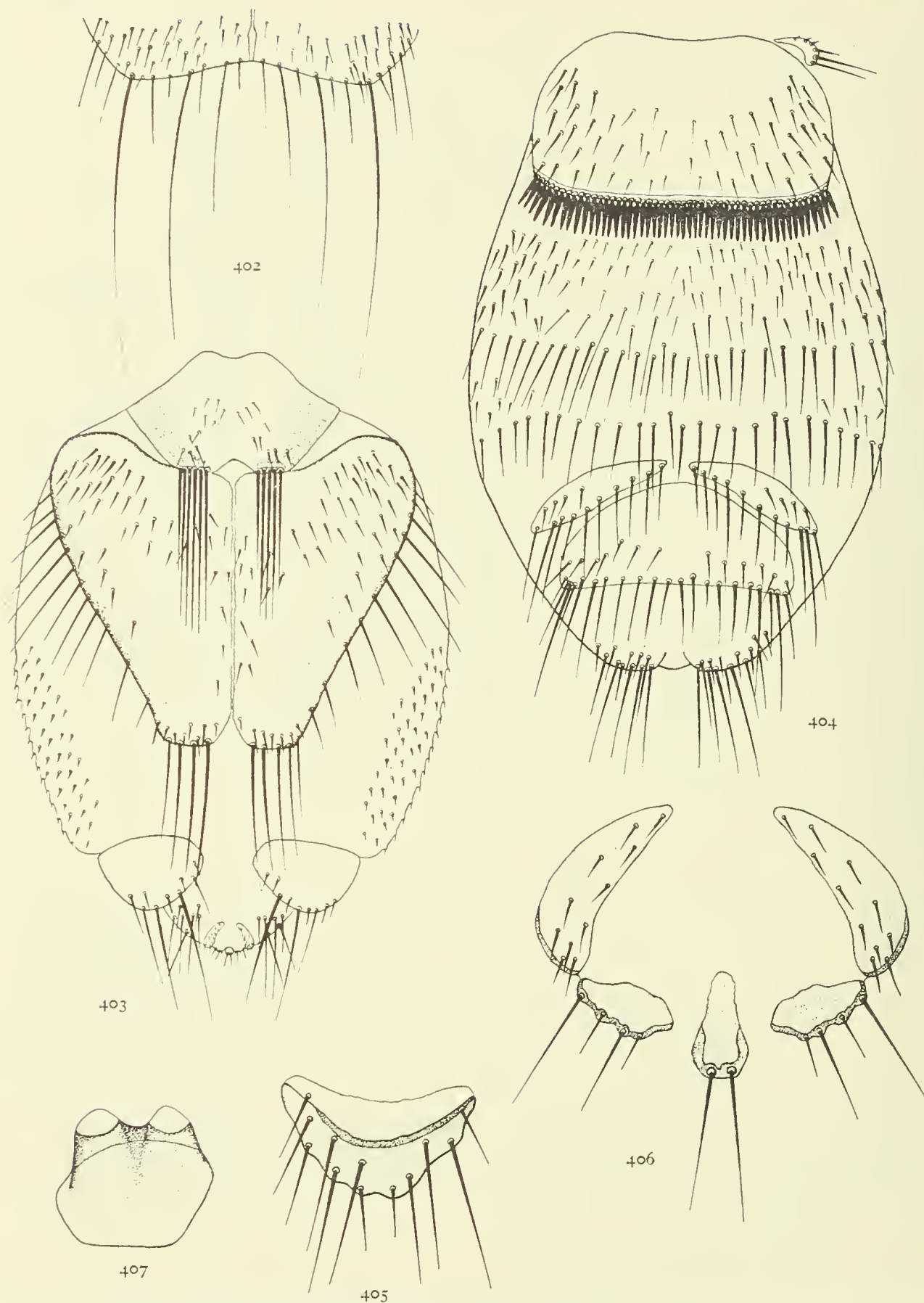
*Basiliatenuispina*. Theodor, 1957, *Parasitology*, **47**, 457

Length 2.7 mm. Colour yellowish brown.

*Head*. 6 setae at the anterior dorsal margin. Labella of the proboscis half the length of the theca.

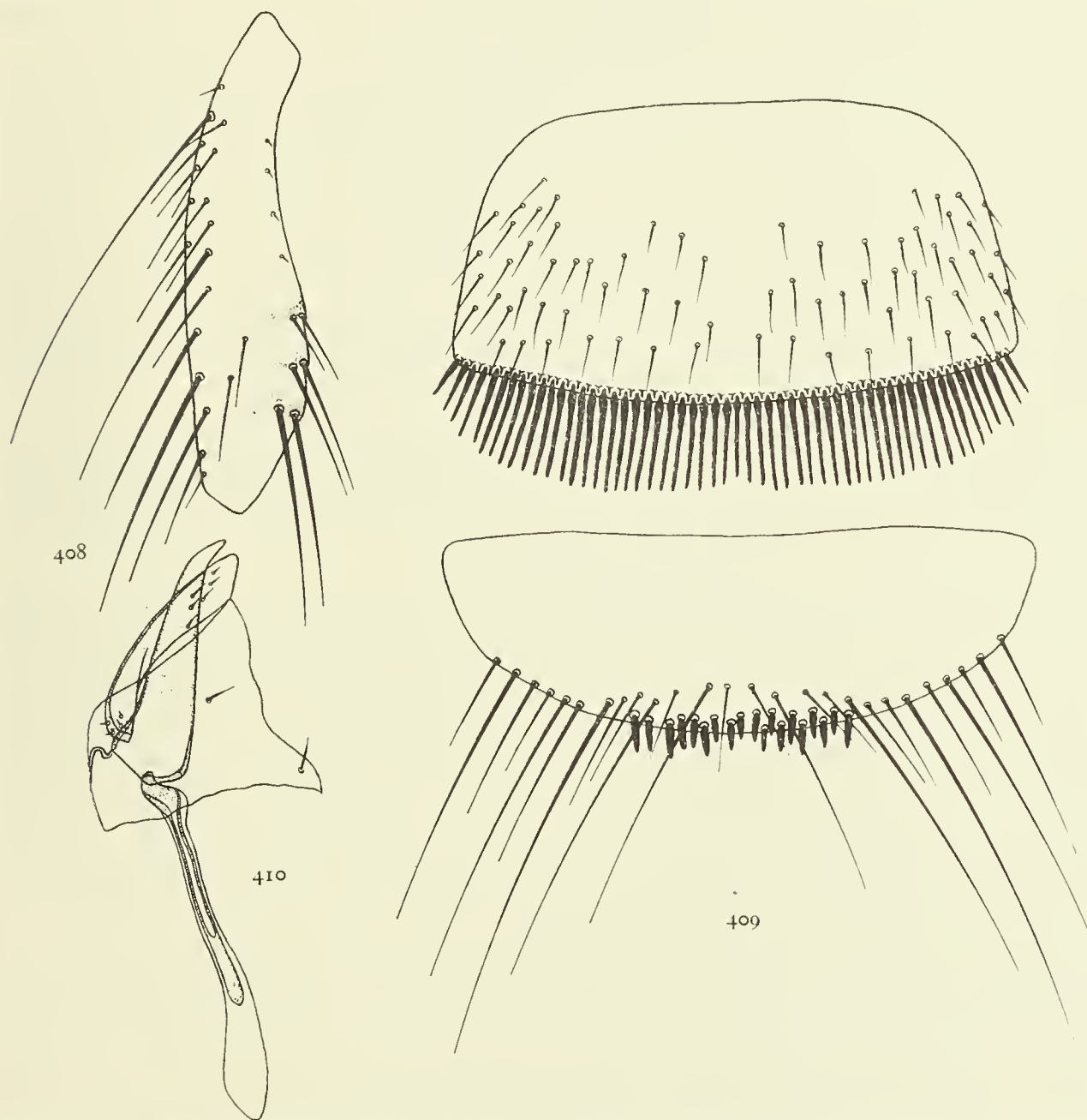
*Thorax*. Wider than long. Length to width = 5 : 6. Angle of oblique sutures 90°. 8 notopleural setae. Tibiae 4 times as long as wide.

*Male abdomen*. Tergite 2 with broadly rounded posterior margin which bears a row of moderately long, thin setae and a few spines. An irregular double transverse row on the surface.



Figs. 402-407. *Basilia seminuda* Theodor. Female. 402. postero-ventral margin of thorax; 403. abdomen, dorsal; 404. same, ventral; 405. genital plate; 406. anal sclerites; 407. eye.

Tergite 3 with a similar marginal row, tergites 4-6 with 4-6 very long setae in the middle of the marginal rows. Tergites 3-6 with bare surface. No gap in the middle of the marginal row of tergite 6. Anal segment conical, with long setae posteriorly and some short setae dorsally. Sternite 1 + 2 with a ctenidium of about 50 very slender spines. They are about 10 times as long as wide. Sternite 5 rounded posteriorly, with a double row of 18 spines at the posterior margin.



Figs. 408-410. *Basilia tenuispina* Theodor. Male. 408. tibia 3; 409. sternite 1+2 and sternite 5; 410. genitalia.

*Genitalia.* Claspers slightly curved, tapering to a pigmented tip. Basal arc weakly developed, rounded, with a short anterior process. Phallobase short, conical, with 2 setae near the base and 2 further apically. Aedeagus thick at the base, tapering to a sharp point. Apodeme short, with a narrow end-plate. Parameres slender, slightly curved, with rounded apical end.



Female unknown.

CONGO. Nia Nia, near Stanleyville, from *Epomops franqueti*, ♂ holotype, Musée Royale de l'Afrique Centrale, Tervuren.

#### THE AMERICAN SPECIES OF *BASILIA*

The American species of the genus *Basilia* have been studied by Guimarães (1946, 1956) whose detailed descriptions should be consulted for identifications. Guimarães gives complete documentation and lists of localities and hosts. They will be dealt with more briefly than the Old World species and only essential differential characters and relevant references will be given as the available material is scanty. They are here considered as forming groups of the subgenus *Basilia* s.str.

Guimarães assumes that two ancestral stocks entered North America from the Old World with Vespertilionid bats and gave rise to two groups which are based mainly on the combination of two characters. One group possesses posterior processes on the tergal plate 2 of the female abdomen and an undivided sternite 6, and the other group has a rounded or straight posterior margin of tergal plate 2 and a divided sternite 6.

When Guimarães wrote his monograph in 1956, only 6 Old World species of *Basilia* were known to him. Several other species of the genus were considered as belonging to the genus *Penicillidia*. Since then the number of species in the Old World (including *Tripselia*) has increased to nearly 50 and it is now possible to judge the significance of the various characters more clearly.

A divided and an undivided sternite 6 may occur in the same group of the genus. Thus, several species of the *nattereri* group have sternite 6 divided into 2 or 3 sclerites, while *B. italica* of the same group has an undivided sternite 6. Most species of the *bathybothyra* group have sternite 6 divided, but one species of the group has an undivided sternite 6. The development of the posterior processes of tergal plate 2 can be followed in a long series of transitions in the Old World species, from rounded lobes to long slender processes, but always associated with a divided sternite 6. A similar series of transitions could be constructed for the American species, from concentration of the long setae in the median parts of the posterior margin of tergal plate 2 to a gradual lengthening of these parts and the formation of short and rounded processes to very long and slender processes. Many of the American species resemble Old World species of the *bathybothyra* group, except for the undivided sternite 6, which according to Guimarães is a primitive character, and except for the absence of tergal plate 3. In order to assume the entrance of a species with a certain combination of characters into America, such a combination, or a more primitive condition, must have existed in the Old World, but this has not, so far, been found. It may, of course, have existed and become extinct. Division of sternite 6 and the development of posterior processes have probably occurred independently in various groups and the combination of characters on which Guimarães based his two groups has probably developed later.

The main difference between species of the New World and the Old World is the absence of tergal plate 3 in the majority (26 out of 30) of the American species. This sclerite is absent in species with and without posterior processes on tergal plate 2, and in species with divided and

with undivided sternite 6. This tergal plate is present in all Old World species of the genus, there are even species with two tergites between tergal plate 2 and the anal segment. The male genitalia of the American species, as far as they have been described, are closely similar, having a short, wide aedeagus, which has serrations in some species. Only one Old World species (*B. italica*) has an aedeagus like some American species, and the aedeagus of the species of the *eileenae* group is also rather short and wide. No Old World species has serrations on the aedeagus like the American species and only a few American species have a longer, curved and tapering aedeagus, like so many Old World species.

It thus seems that the importance of the combination of the two characters discussed as indicating the separate origin of the two groups has been over-estimated. For the reasons given, the two-fold origin of the American species seems doubtful, and the nearly general absence of tergal plate 3, the great uniformity of the male genitalia and the great similarity of the males in general are in favour of a common origin of the majority of American species. This does not, of course, exclude the possibility, that some of the aberrant species, as for instance the *antrozoi* group, may have a different origin.

Guimarães divides the American species into 7 groups. Some of these groups seem to be based on characters of specific rank and a division into 4 groups is proposed here.

1. *antrozoi* group. This corresponds to group 1 of Guimarães which is clearly defined. It contains 2 closely related North American species which differ from all other American species in the possession of a tergal plate 3 which is divided into lateral sclerites and of characteristic male genitalia.

2. *forcipata* group. This would contain groups 5 and 6 of Guimarães, each consisting of a single species; as the form of the anal segment does not seem a sufficient reason for keeping the two species concerned in separate groups.

3. *speiseri* group. This would contain the large South American group 3 of Guimarães containing species with a rounded tergal plate 2, no tergal plate 3 and divided sternite 6. *B. hugh-scotti* which by itself forms group 2 of Guimarães and the two species of group 4 of Guimarães, *B. anceps* and *B. juquiensis*, which are very closely related, are included in the *speiseri* group, of which they may form a subdivision.

4. *ferruginea* group. This corresponds to Guimarães' group 7 containing the species with posterior processes of tergal plate 2, no tergal plate 3, and undivided sternite 6.

*B. forcipata* resembles species of the *bathybothyra* group in the form of tergal plate 2, in the presence of tergal plate 3 with posterior, seta bearing processes and the elongate form of the anal segment. It differs from them in the absence of the two groups of long setae on tergite 1, in the possession of an undivided sternite 6 and in the special development of the genitalia.

The American species are thus mainly characterized by the absence of tergal plate 3 in most species and characteristic male genitalia. A tergal plate 3 is present in only 4 species and these have different male genitalia.

#### KEY TO THE AMERICAN SPECIES OF *BASILIA*

##### FEMALES

- |   |  |   |
|---|--|---|
| 1 | 3 tergal plates on the abdomen before the anal segment.      | 2 |
|   | Only 2 tergal plates on the abdomen before the anal segment. | 5 |



2. Tergal plate 3 undivided, sternite 6 undivided. 3  
Tergal plate 3 divided into widely separated sclerites, sternite 6 divided. 4
3. Tergite 1 with a row of short setae posteriorly. Tergal plate 3 small, with 2 posterior processes which bear setae. Anal segment long, parallel-sided, with long posterior processes (Figs. 432, 449, 450). **B. forcipata** (p. 257)  
Tergite 1 with 2 groups of 4-5 long setae with a concavity between them. Tergal plate 3 broader, without posterior processes. Anal segment short, strongly conical, without posterior processes. **B. anomala** (p. 258)
4. Tergite 1 large, with 2 groups of 3-4 setae posteriorly which reach beyond the middle of tergal plate 2. Short setae cover the greater part of the surface of tergal plate 2. Sternite 1 + 2 large. Spines of the abdominal ctenidium long (Figs. 443-445). **B. antrozoi** (p. 254)  
Tergite 1 smaller, with 2 groups of about 6 short setae which do not reach to the middle of the tergal plate 2. Short setae mainly in the lateral parts of tergal plate 2. Sternite 1 + 2 short. Spines of the abdominal ctenidium short (Figs. 431, 446-448). **B. pizonychus** (p. 256)
5. Tergal plate 2 with posterior processes with long setae. Sternite 6 undivided. 6  
Tergal plate 2 with rounded or straight posterior margin. Sternite 6 divided. 15
6. Posterior processes of tergal plate 2 very long and narrow, with only 2-3 setae, widely separated. 7  
Posterior processes of tergal plate 2 wider, with 3-4 setae. 8
7. Posterior part of the mesonotum with a long, triangular, median dorsal process. Sternite 7 triangular, much longer than sternite 6 and reaching far beyond the anal segment (Figs. 467, 468). **B. wenzeli** (p. 270)  
Posterior part of the mesonotum without such a process. Sternite 7 rounded, not longer than sternite 6 and not reaching beyond the anal segment (Figs. 436, 459, 460). **B. corynorhini** (p. 265)
8. Posterior part of the mesonotum with a median dorsal process. 9  
Posterior part of the mesonotum without such a process. 13
9. Posterior process of the mesonotum triangular, sometimes absent (see No. 14). Tergite 1 with a row of short setae. Posterior processes of tergal plate 2 broadly rounded. Spines on the pleurae very small. Anal segment strongly conical, short (Figs. 434, 461, 462). **B. plaumanni** (p. 266)  
Posterior median process of the mesonotum digitiform. 10
10. Tergite 1 with a row of short setae posteriorly, with a gap in the middle. Setae less than half the length of tergite 1. Posterior processes of tergal plate 2 broadly rounded. Short setae on the surface of sternite 3 longer than the spines on the pleurae anteriorly (Figs. 463, 464). **B. rondanii** (p. 267)  
Tergite 1 with 2 groups of closely placed long setae posteriorly which reach well into the middle of the tergal plate. 11
11. Posterior processes of tergal plate 2 spatulate, with a bare stem, separated by a rounded space which is wider than the processes are broad. Anal segment nearly parallel-sided. Sternite 7 triangularly produced posteriorly (Figs. 433, 455, 456). **B. bequaerti** (p. 262)  
Posterior processes of tergal plate 2 broadly rounded or angular, separated by a narrow incision in the middle. 12
12. The 2 groups of setae on tergite 1 are separated by a wide concavity. Posterior processes of tergal plate 2 broadly rounded, bearing 4 long setae, some very long, and some shorter spines. Setae on the surface of the tergal plate short. Very short spines on sternite 3. Sternite 6 short, triangular (Figs. 457, 458). **B. boardmanni** (p. 263)  
The 2 groups of setae placed close together at the apex of tergite 1, separated by a narrow incision. Tergal plate 2 more elongate, with posterior processes which have an outer angle and bear 3 long setae and 3-4 spines. Long setae on the anterior lateral parts of tergal plate 2. Longer setae on sternite 3. Sternite 6 large, truncate triangular, longer than sternite 7 (Figs. 453, 454). **B. bellardii** (p. 261)



13. Tibiae with 4 rows of long setae in the distal half of the ventral edge (Figs. 451, 452).  
*B. ferruginea* (p. 259)  
Tibiae with only 3 rows of setae. 14
14. Pleurae covered with short setae. Marginal setae on tergite 1 short (Figs. 435, 465, 466).  
*B. silvae* (p. 269)  
Pleurae covered with only very short spines. Marginal setae on tergite 1 longer (Figs. 434, 461, 462).  
*B. plaumanni* (p. 266)
15. Sternal plate of the thorax very wide, length to width = 2 : 3. Abdominal ctenidium consisting of about 32 short spines which are more widely spaced than in other species. Tibiae with strongly rounded ends and with 4-5 rows of long setae. Tergite 1 with 2 large rounded lobes which each bear about 20 long setae at the posterior margin.  
*B. hughscotti* (p. 278)  
Sternal plate of thorax less wide, abdominal ctenidium consisting of about 50-70 closely placed spines. Tibiae with only 3 rows of setae. 16
16. Tergite 1 broadly rounded posteriorly, with only short spines in the middle of the posterior margin and with setae laterally (Fig. 479).  
*B. mirandaribeiroi* (p. 279)  
Tergite 1 with a marginal row of setae and some spines posteriorly. 17
17. Tergite 1 short, with a marginal row of short and long setae. Sternite 4 not discernible. Sternite 1 + 2 very long. Tergal plate 2 very narrow, each half twice as long as wide. A group of long setae in the anterior lateral corners of tergal plate 2 and a group of short setae in the middle. 18  
Tergite 1 longer, tergal plate 2 much wider. 19
18. Setae on the pleurae all moderately long (Figs. 477, 478).  
*B. juquiensis* (p. 279)  
Setae on the pleurae long anteriorly, only short spines posteriorly. *B. juquiensis anceps* (p. 279)
19. Tergite 1 broadly rounded posteriorly. 20  
Tergite 1 more or less triangular, with apex posteriorly and straight or concave sides. 22
20. Mesonotum with a small dorsal process posteriorly. Lateral halves of tergal plate 2 rhomboidal, slightly produced posteriorly. Lateral plates of sternite 5 wider than those of sternite 6 which have setae only in the middle of the posterior margin. Sternite 7 nearly rectangular, about 1.5 times as wide at the base as long. Setae of marginal row of sternite 4 very short. Anal segment nearly parallel-sided (Figs. 439, 473, 474).  
*B. costaricensis* (p. 274)  
No median dorsal process on the mesonotum. Setae of the marginal row of sternite 4 as long as those of sternite 3. Sternite 6 with setae along the whole posterior margin. Sternite 7 wider at the base, triangular. 21
21. Pleurae covered with very short spines on tubercles (Figs. 437, 469, 470).  
*B. carteri* (p. 271), *B. dunni* (p. 278)  
Pleurae bare posteriorly, with a small group of short spines in the middle of a bare area. Longer setae anteriorly.  
*B. dubia* (p. 276)
22. Tergite 1 as long as tergal plate 2, with only short setae at the apex. Tergal plate 2 very wide, covering the pleurae partly, with straight posterior margin.  
*B. travassosi* (p. 284)  
Tergite 1 longer, posterior margin of tergal plate 2 rounded or forming an obtuse angle. 23
23. Tergite 1 markedly longer than the halves of tergal plate 2 which consists of rhomboidal or irregularly triangular plates. Lateral plates of sternite 5 distinctly narrower than the plates of sternite 6. Posterior row on sternite 4 consisting of short spines only. 24  
Tergite 1 not longer than the lateral plates of tergal plate 2. 25
24. Tergite 1 triangular, with a narrow apex which bears 1-3 setae in each half. Posterior margin of tergal plate 2 evenly rounded.  
*B. peruvia* (p. 282)  
Tergite 1 very long, with concave sides, broader and rounded posteriorly, with about 10 closely placed setae in each half, the setae pointing obliquely outward. Tergal plate 2 with posterior margin with an angular indentation in the middle (Figs. 438, 471, 472).  
*B. constricta* (p. 273)

NYCTERIBIINAE

BASILIA

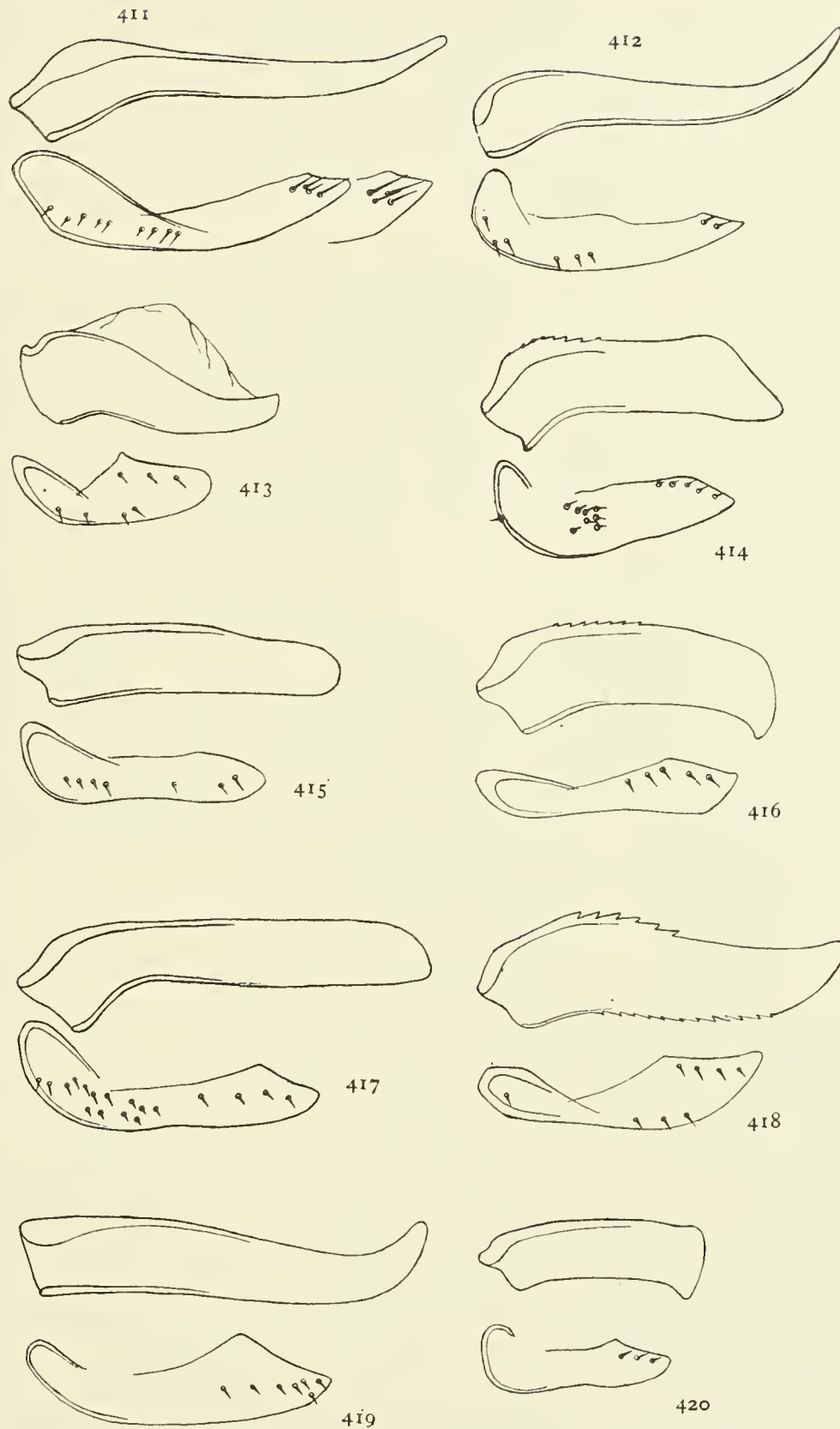
25. Anal segment nearly parallel-sided. 26  
 Anal segment broad and strongly conical. 27
26. 4-6 setae at the apex of each half of tergite 1 (Figs. 440, 482, 483). **B. speiseri** (p. 282)  
 Usually 7-8 setae at the apex of each half of tergite 1 (Figs. 441, 480, 481). **B. ferrisi** (p. 278), **B. myotis** (p. 281)
27. Tergal plate 2 with short setae approaching the median line anteriorly. Lateral plates of sternite 6 nearly rectangular. Anal segment with numerous short setae on the surface. **B. guimaraesi** (p. 278)  
 Tergal plate 2 with short setae only in the outer part of each half, not near the median line.  
 Lateral plates of sternite 6 triangular, their inner margin about twice as long as the outer margin.  
 Anal segment nearly bare dorsally (Figs. 442, 475, 476). **B. currani** (p. 276)

MALES

The key to the males of the American species is of limited value. It contains only the 20 species of which the genitalia have been described. The males of 7 species are unknown, those of some species are incompletely described and several males are described from single specimens, so that no information about possible variation within the species is available.

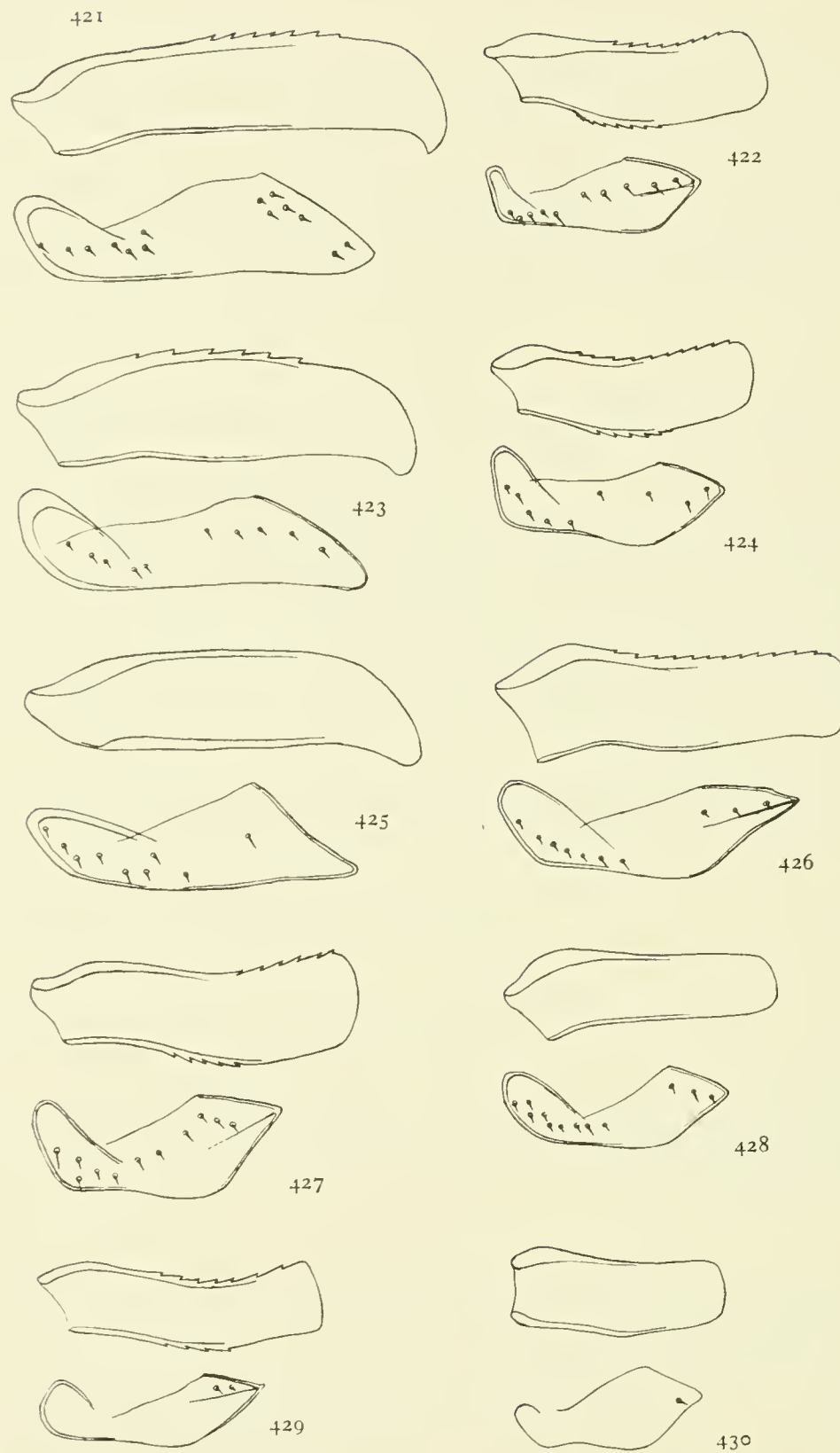
The chaetotaxy of the males of the American species provides very few useful characters. The tergites have marginal rows of setae alternating with spines. The setae are short on tergites 2 and 3, longer on tergite 4, and have 4-6 very long setae on tergites 5 and 6. The marginal rows may be double or single. Tergite 2 has setae on the surface in many species, tergites 3 and 4 only in a few species. The group of spines on sternite 5 which possesses valuable characters in other genera of Nycteribiidae is very uniform in the American species of *Basilia*. On the other hand it varies within the species to a considerable degree so that it gives useful information in only a few cases. The key had therefore to be based to a large extent on the structure of the aedeagus (Figs. 411-430). Several species which are more or less clearly differentiated in the females are practically indistinguishable in the males.

1. Tibiae with 4 rows of setae on the ventral edge. Sternite 5 with a group of about 30-40 spines. Aedeagus serrated dorsally and ventrally, with slightly upturned end. **B. ferruginea** (p. 259)  
 Tibiae with only 3 rows of setae. 2
2. Phallobase with a slender dorsal process at the base which bears 2 minute hairs. Aedeagus short, curved, tapering to a rounded point (Fig. 413). **B. forcipata** (p. 257)  
 No such process. 3
3. Tergites 2-4 with short setae on the surface. (Few on tergite 4.) 4  
 Only tergite 2 with setae on the surface, tergites 3-6 bare. 6  
 Tergites 2-6 bare on the surface, except for a few short hairs at the sides of the surface of tergite 2. 14
4. Marginal rows of tergites 2-6 double. Tergites wide and short. Sternite 5 with a group of about 40 spines in 2-3 rows. Vertex of the head with about 25 setae. Aedeagus long and slender, 7 times as long as wide, with rounded end, slightly curved basally, without serrations (Fig. 417). **B. boardmanni** (p. 263)  
 Marginal rows of tergites 2-6 simple. 5
5. Aedeagus short and wide, without serrations (Fig. 428). **B. currani** (p. 276)  
 Aedeagus long and slender, without serrations, gradually tapering to a fine tip (Figs. 411, 412). **B. antrozoi** (p. 254), **B. pizonychus** (p. 256)
6. Sternite 5 with a group of about 30 spines. Aedeagus short and wide, parallel-sided, with dorsal serrations and a triangular end with the apex ventrally (Fig. 414). **B. rondanii** (p. 267)  
 Sternite 5 with a group of about 15-25 spines. 7
7. Aedeagus long and slender, 5-6 times as long as wide at the base, curved, tapering to a rounded, upturned end (Fig. 419). **B. wenzeli** (p. 270)  
 Aedeagus short and wide, 3-4 times as long as wide 8
8. Marginal rows of tergites 2-6 double. 9



Figs. 411-420. Aedeagus and paramere of American species of *Basilia*: 411. *B. antrozoi* (Townsend); 412. *B. pizonychus* Scott; 413. *B. forcipata* Ferris; 414. *B. rondanii* Guimarães & d'Andretta; 415. *B. corynorhini* (Ferris); 416. *B. plaumanni* Scott; 417. *B. boardmanni* Rozeboom; 418. *B. bequaerti* Guimarães & d'Andretta; 419. *B. wenzeli* Guimarães & d'Andretta; 420. *B. silvae* (Brèthes).





Figs. 421-430. Aedeagus and paramere of American species of *Basilia*: 421. *B. carteri* Scott; 422. *B. myotis* Curran; 423. *B. dubia* Guimarães & d'Andretta; 424. *B. peruvia* Guimarães & d'Andretta; 425. *B. costaricensis* Guimarães & d'Andretta; 426. *B. constricta* Guimarães & d'Andretta; 427. *B. speiseri* (Miranda Ribeiro); 428. *B. currani* Guimarães; 429. *B. ferrisi* Schuurmans Stekhoven; 430. *B. travassosi* Guimarães.

Marginal rows of tergites 2-6 single.

10

9. Aedeagus parallel-sided, with dorsal serrations and sharp or rounded ventral apical tooth. Parameres with large triangular end with a rounded tip (Figs. 421, 423).

*B. dubia* (p. 276), *B. carteri* (p. 271)

Aedeagus without dorsal serrations and with a rounded end which is directed ventrally. Parameres with sharp angular end (Fig. 425).

*B. costaricensis* (p. 274)

10. Aedeagus without serrations, short, parallel-sided, with a short ventral apical tooth. Chile (Fig. 420).

*B. silvae* (p. 269)

Aedeagus with serrations.

11

11. Aedeagus parallel-sided, with serrations only dorsally.

12

Aedeagus with serrations dorsally and ventrally.

13

12. Aedeagus spatulate (Fig. 426).

*B. constricta* (p. 273)

Aedeagus curved, with ventral apical tooth (Fig. 416).

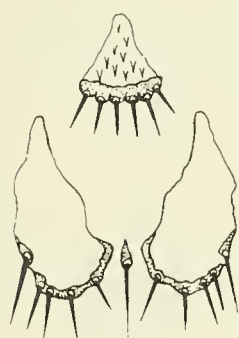
*B. plaumanni* (p. 266)

13. Aedeagus short, 3 times as long as wide, spatulate, slightly concave dorsally (Fig. 424).

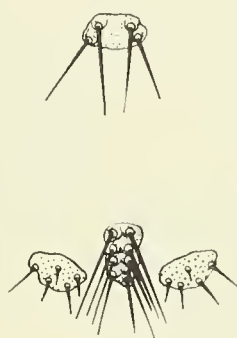
*B. peruvia* (p. 282)

Aedeagus tapering in the apical quarter, with rounded upturned tip (Fig. 418).

*B. bequaerti* (p. 262)



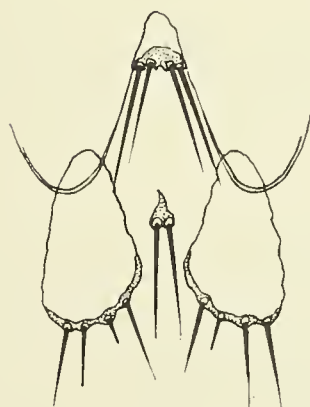
431



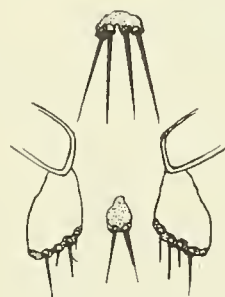
432



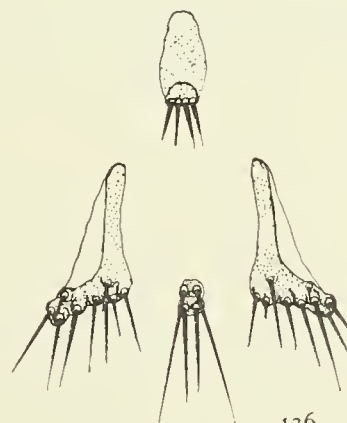
433



434



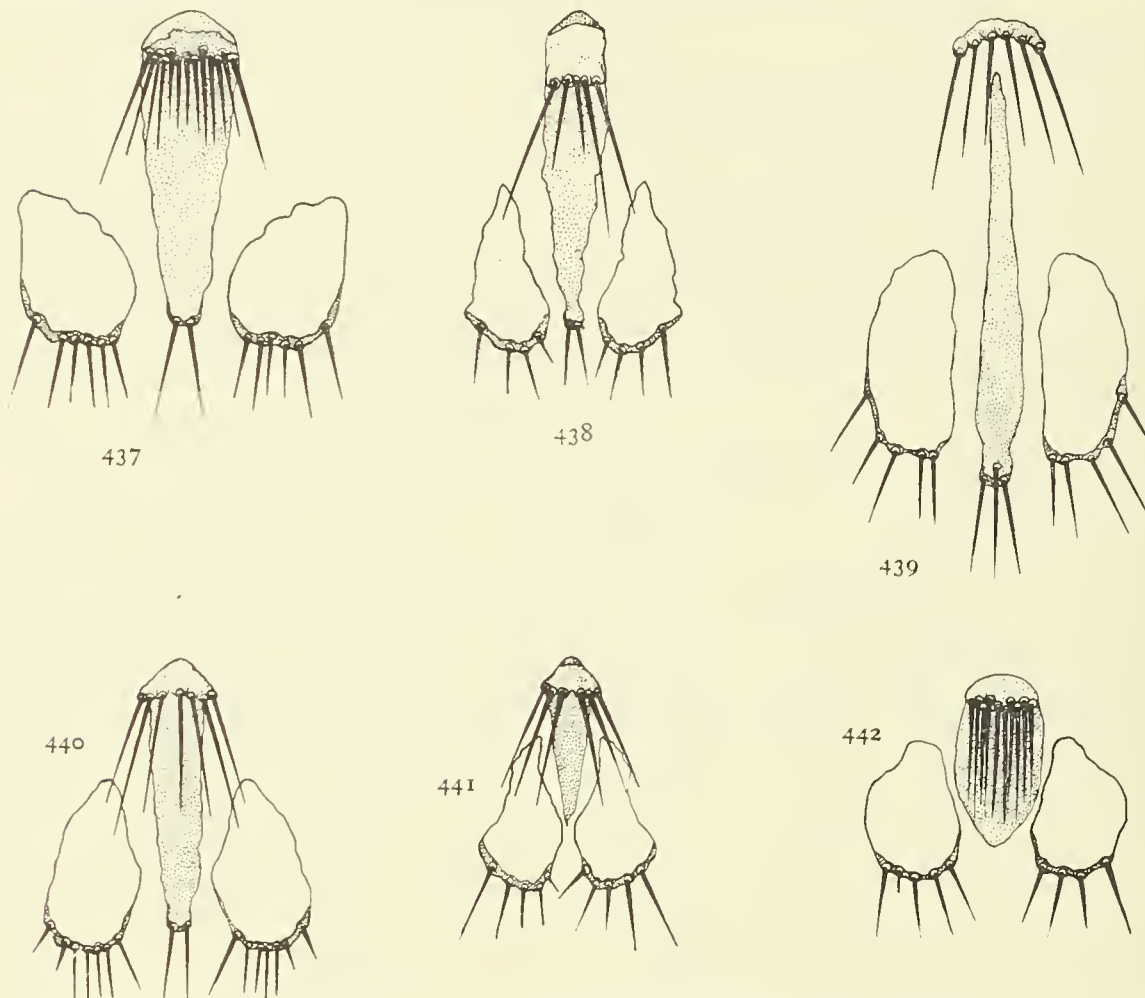
435



436

Figs. 431-436. Genital plate, anal sclerite and adanal plates of American species of *Basilia*: 431. *B. pizonychus* Scott; 432. *B. forcipata* Ferris; 433. *B. bequaerti* Guimarães & d'Andretta; 434. *B. plaumanni* Scott; 435. *B. silvae* (Brèthes); 436. *B. corynorhini* (Ferris).

14. Aedeagus spatulate, with parallel sides or widening apically, with serrations dorsally and ventrally (Figs. 422, 427, 429). **B. speiseri** (p. 282, **B. myotis** (p. 281). **B. ferrisi** (p. 278)  
Aedeagus without serrations. 15
15. Aedeagus parallel-sided, 3 times as long as wide, spatulate. Parameres with sharp, angular end (Fig. 430). **B. travassosi** (p. 284)  
Aedeagus tapering to a rounded end, 4-5 times as long as wide at the base. Parameres with rounded end (Fig. 415). **B. corynorhini** (p. 265)



Figs. 437-442. Genital plate, anal sclerite and adanal plates of American species of *Basilia*: 437. *B. carteri* Scott; 438. *B. constricta* Guimarães & d'Andretta; 439. *B. costaricensis* Guimarães & d'Andretta; 440. *B. speiseri* (Miranda Riberio); 441. *B. myotis* Curran; 442. *B. currani* Guimarães.

#### ANTROZOI GROUP

#### *Basilia antrozoi* (Townsend, 1893)

(Figs. 411, 443-445)

*Nycteribia antrozoi*. Townsend, 1893, *Jour. New York Ent. Soc.* **1**, 79.

*Penicillidia antrozoi* Townsend. Ferris, 1916, *Ent. News*, **27**, 433.

*Basilia antrozoi* Townsend. Ferris, 1924, *Ent. News*, **35**, 191.

*Basilia antrozoi* Townsend. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

*Basilia antrozoi* Townsend. Peterson, 1960, *Proc. Ent. Soc. Ontario*, **90**, 30.

**Head.** 12 setae at the anterior dorsal margin and 2-4 between the eyes.

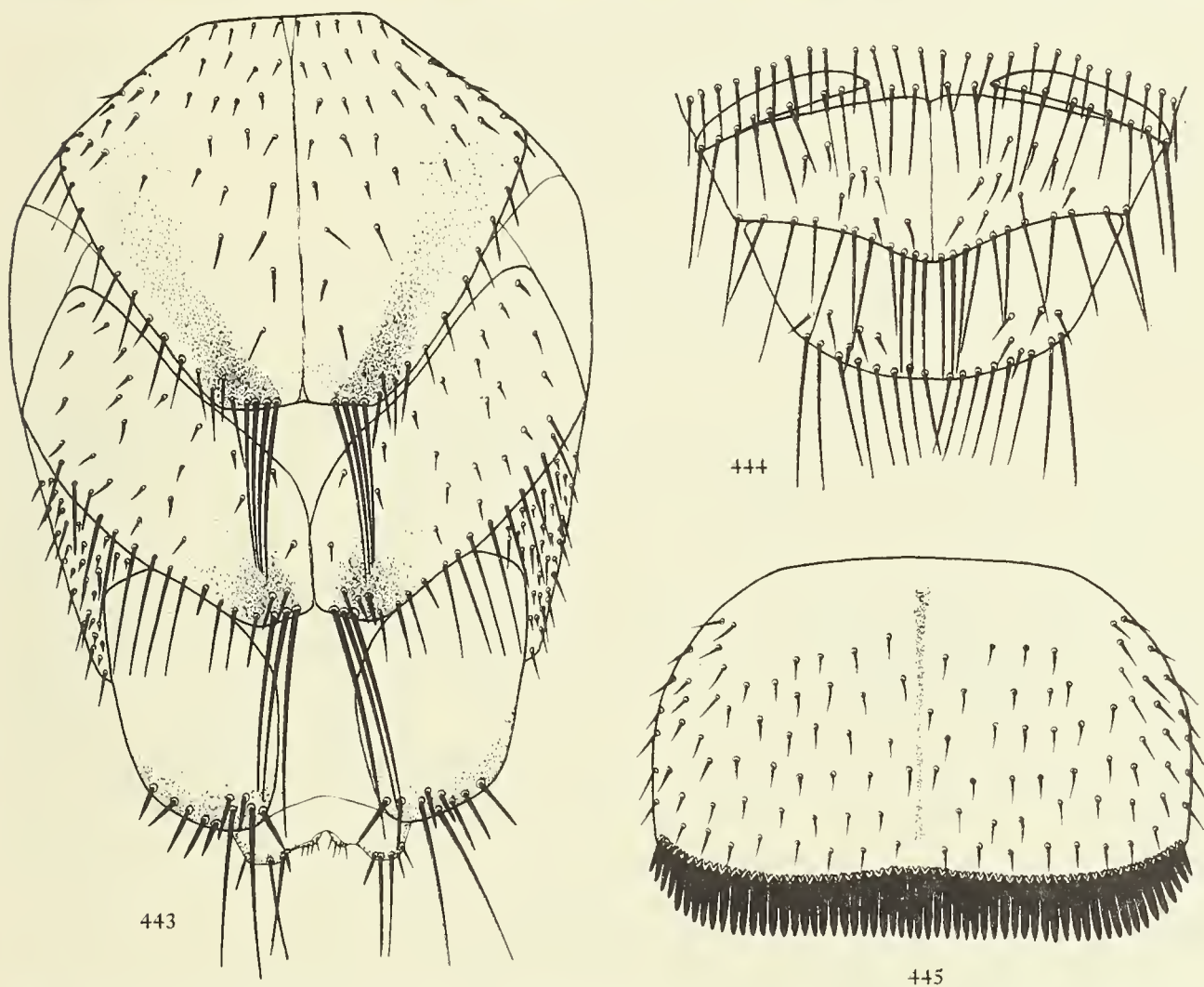
**Thorax.** 9-11 notopleural setae and a few short hairs anterior to the row



*Male abdomen.* Marginal rows of the tergites single. Tergites 2 and 3 with some short setae on the surface, also on tergite 4 in some specimens. Sternite 5 with a group of about 25 spines in 2 rows at the posterior margin.

*Genitalia.* Aedeagus slender, tapering to a point, slightly curved. Parameres with triangular apical end.

*Female abdomen.* Tergite 1 very large, rounded posteriorly, with 2 groups of 3-4 moderately long setae posteriorly, with a short gap between them. These setae reach to the middle of tergal



Figs. 443-445. *Basilia antrozoi* (Townsend). Female. 443. abdomen, dorsal; 444. same, ventral, posterior part; 445. sternite 1+2.

plate 2 in some specimens, to its posterior margin in others. Tergal plate 2 short, consisting of two nearly rectangular, obliquely placed sclerites with 3-4 long setae at the inner posterior corners and more widely spaced shorter setae laterally. Surface covered with short setae in its greater part. Tergal plate 3 divided into two widely separated rhomboidal sclerites with 1-2 long and several short setae posteriorly. Sternite 1 + 2 large, rectangular, with a ctenidium of about 60 long spines. Sternite 5 consisting of narrow lateral sclerites which are widely separated. Sternite 6 is divided into larger, triangular sclerites which reach the midline. Sternite 7 rounded posteriorly, undivided, shorter than 6. Anal segment with 3-4 setae at the posterior processes

and a few setae laterally. Genital plate with 6–8 short spines. Adanal plates similar to those of *B. pizonychus* (Fig. 431).

Distribution and hosts: south-western parts of North America, Mexico, mainly on *Antrozous pallidus*, rarely on species of *Corynorhinus*, *Myotis*, *Tadarida*.

MATERIAL IN THE COLLECTION

U.S.A.

Utah, Dewey Bridge, Grand Co., from *Antrozous pallidus*, 14.v. 1954, B. V. Peterson, 1 ♀.

***Basilias pizonychus* Scott, 1939**

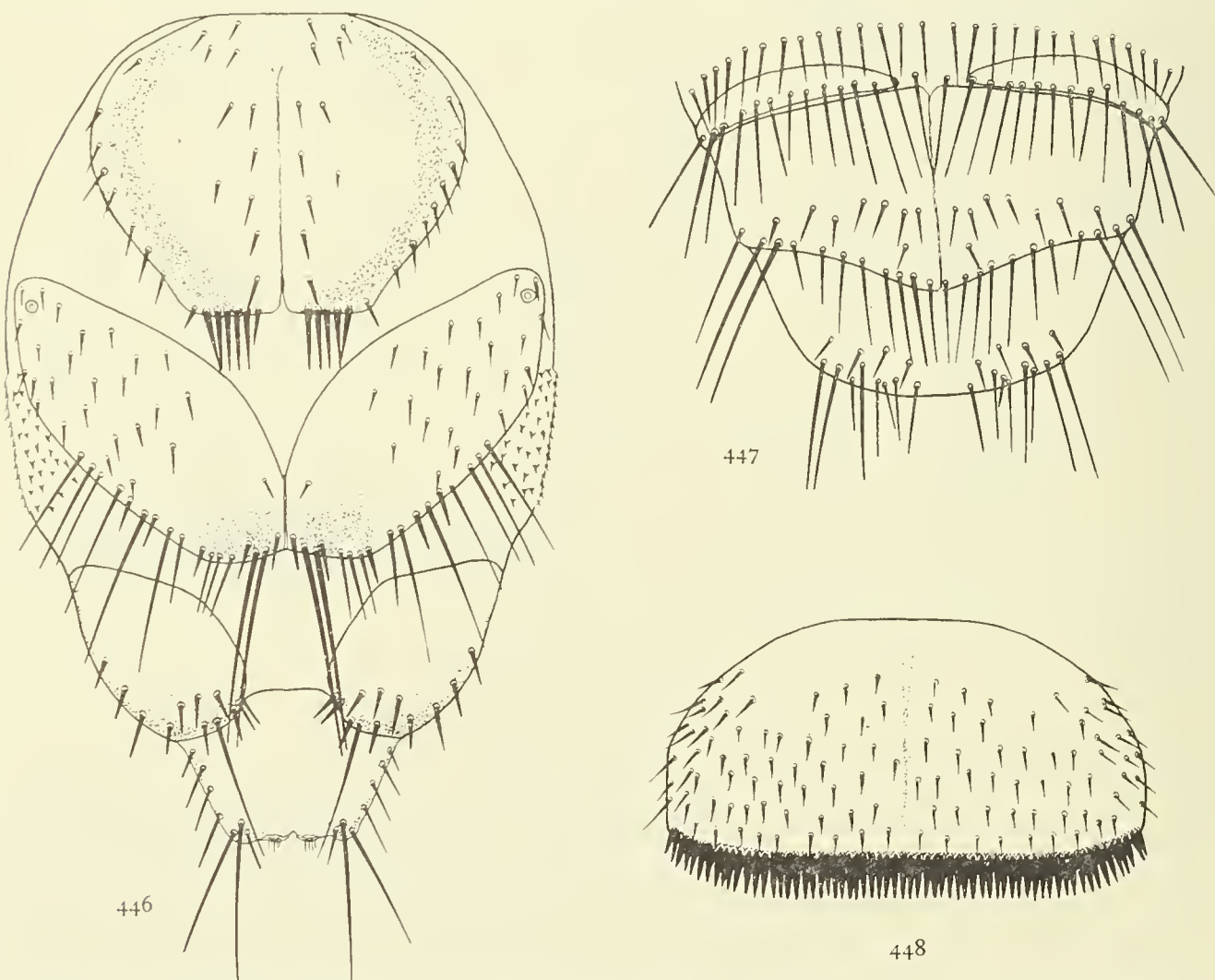
(Figs. 412, 431, 446–448)

*Basilias pizonychus*. Scott, 1939, *Allan Hancock Pacific Expedition*, 2, 167.

*Basilias pizonychus* Scott. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1

Closely resembling *B. antrozoi*, differing as follows:

*Female abdomen*. Tergite 1 smaller, with 2 groups of 5–6 short, thick setae. Tergal plate 2 more produced in the middle posteriorly. The short setae are restricted to the lateral parts of



Figs. 446–448. *Basilias pizonychus* Scott. Female. 446. abdomen, dorsal; 447. same, ventral, posterior part; 448. sternite 1+2.

the sclerites. Tergal plate 3 with the short setae extending further anteriorly than in *B. antrozoi*. Sternite 1 + 2 shorter, with much shorter spines.

*Male abdomen* and genitalia as in *B. antrozoi*. The parameres have a shorter and more pointed apical end.

Distribution and host: Gulf of California, Mexico, from *Pizonyx vivesi*.

#### MATERIAL IN THE COLLECTION

##### MEXICO

Angel de la Guardia Island, Gulf of California, from *Pizonyx vivesi*, 20.iii. 1937, J. Garth, Allan Hancock Pacific Expedition, 1 ♂ 1 ♀ paratypes (Brit. Mus. 1938.499).

Patos, Gulf of California, from *Pizonyx vivesi*, 26.iii. 1937, J. Garth, Allan Hancock Pacific Expedition, 1 ♂ 1 ♀ paratypes (Brit. Mus. 1938.499).

#### FORCIPATA GROUP

##### *Basilias forcipata* Ferris, 1924

(Figs. 413, 432, 449, 450)

*Basilias forcipata*. Ferris, 1924, *Ent. News*, **35**, 191.

*Basilias calverti*. Fox & Stabler, 1953, *Jour. Parasitol.* **39**, 22.

*Basilias forcipata* Ferris. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

*Basilias forcipata* Ferris. Peterson, 1960, *Proc. Ent. Soc. Ontario*, **90**, 30.

Head with 4–6 setae at the anterior dorsal margin and 2 setae between the eyes. 10–12 notopleural setae.

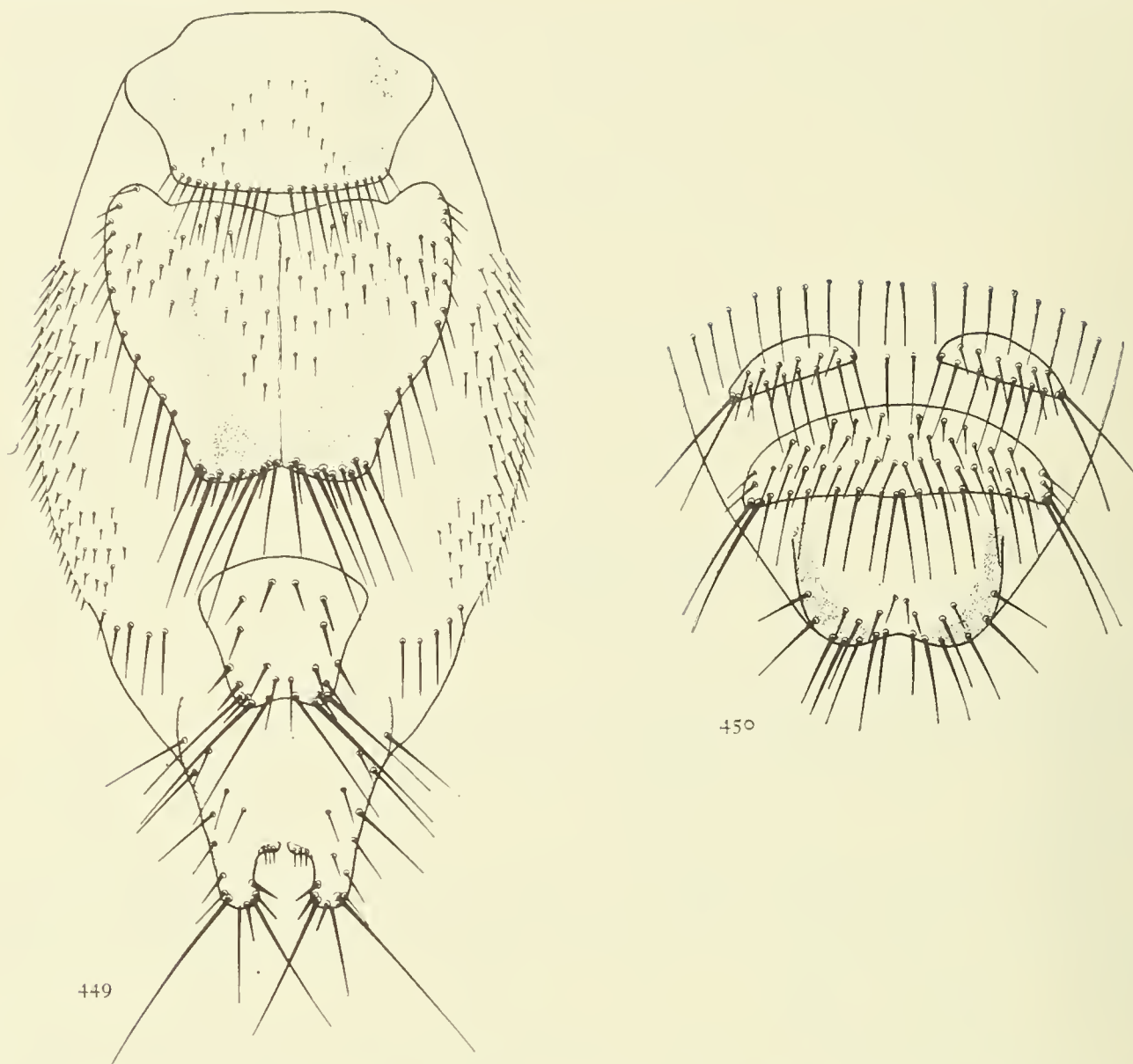
*Male abdomen*. Marginal rows of the tergites single. Tergite 2 with short setae on the surface, a few setae on tergites 3 and 4. Tergites 5 and 6 bare. Sternite 5 with a convex posterior margin with a group of about 20 spines in 2 rows, those of the posterior row longer and more widely spaced.

*Genitalia*. Phallobase with a slender dorsal process which bears 2 minute hairs at the tip. Aedeagus short, tapering to a rounded tip, slightly curved and with a dorsal membrane. Parameres with a rounded apical end.

*Female abdomen*. Tergite 1 with a marginal row of 16–20 short setae with a small gap in the middle. Tergal plate 2 heart-shaped, with broadly rounded posterior processes, each with 4–5 long setae and some spines. 6–8 moderately long setae at the lateral margins. Tergal plate 3 trapezoidal, with 2–3 long setae and some spines at the posterior rounded processes and 4–6 short setae on the surface. Anal segment long, conical, with long anal processes which bear 2–3 long setae and some spines. Pleurae with a field of minute spines posteriorly and longer setae anteriorly. Sternite 1 + 2 short, with a ctenidium of about 60 spines. Sternite 5 with small elliptical lateral sclerites which do not reach the midline. There are 3–4 setae between them. Sternite 6 undivided, rounded anteriorly. Sternite 7 trapezoidal, longer than 6. Genital plate with 4 setae. Anal sclerite with 6–8 short setae, not connected with the genital plate. Anal frame complete. Adanal plates small, of irregular shape, with 5–6 short setae.

Distribution and hosts: western parts of North America, north to British Columbia, Mexico on various species of *Myotis*, rarely on *Tadarida* and *Pipistrellus*.





Figs. 449, 450. *Basilina forcipata* Ferris. Female. 449. abdomen, dorsal; 450. same, ventral, posterior part.

MATERIAL IN THE COLLECTION

U.S.A.

Colorado Springs, from *Myotis volans interior*, 18.vi. 1952, R. M. Fox & R. M. Stabler, 1 ♂ 1 ♀ paratypes of *B. calverti*.

***Basilina anomala* Guimarães & d'Andretta, 1956**

*Basilina anomala*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

No material seen, description after Guimarães.

Head with 6-8 setae at the anterior dorsal margin, 4 setae between the eyes. 8 notopleural setae.

*Female abdomen*. Tergite 1 trapezoidal, with 2 groups of 4-5 setae and a concavity between them. Tergal plate 2 heart-shaped, with broad posterior processes with 3-4 long setae and some

short spines. Surface covered with scattered short setae. Oblique lateral margins with about 8 short setae. Tergal plate 3 undivided, wider than long, with a row of long and short setae posteriorly. Anal segment very short, conical. Pleurae with short spines. Sternite 5 with 2 narrow, curved, parallel-sided sclerites. Sternite 6 undivided, semi-circular. Sternite 7 trapezoidal, not longer than 6. Genital plate with 3 setae.

Male unknown.

Distribution and host: Guatemala, Mexico, from *Rhogeessa tumida*.

*FERRUGINEA* GROUP

***Basilias ferruginea*** Miranda Ribeiro, 1903

(Figs. 451, 452)

*Basilias ferruginea*. Miranda Ribeiro, 1903, *Arch. Mus. Nac. Rio de Janeiro*, **12**, 175; 1907, **14**, 231.

*Basilias ferruginea* Miranda Ribeiro. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479.

*Basilias ferruginea* Miranda Ribeiro. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.

*Basilias ferruginea* Miranda Ribeiro. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

Head with 8 setae at the anterior dorsal margin. 10–12 notopleural setae. Tibiae with 4 rows of setae in the distal half of the ventral edge.

*Male abdomen*. Marginal rows of the tergites single. Tergite 2 with several rows of short setae on the surface, other tergites bare. Sternite 5 with a group of 32–40 spines in 2 rows at the posterior margin, the spines of the posterior row longer. Ventral side of the anal segment thickly covered with setae at the sides.

*Genitalia*. Aedeagus short, parallel-sided, serrated dorsally and ventrally, with slightly upturned apical end. Parameres with rounded end.

*Female abdomen*. Tergite 1 with broadly rounded posterior margin, with a row of short setae with a small gap in the middle. Tergal plate 2 broadly heart-shaped, with broad, rounded posterior processes, each bearing 4–5 long setae and several spines. Surface bare in the middle, some short setae in the lateral anterior corners and along the median line. Pleurae covered with short setae. Anal segment short, nearly parallel-sided, covered with short setae dorsally. Sternite 1 + 2 with a ctenidium of about 60 spines. Sternite 5 with transverse, elliptical, narrow sclerites which do not reach the midline; there are 2 setae between them. Sternite 6 undivided, rounded anteriorly. Sternite 7 longer than sternite 6, trapezoidal. Genital plate with 4 setae. Anal sclerite with 4 setae, not connected with the genital plate. Adanal plates triangular, with about 8 short setae.

Distribution and hosts: Brazil, Paraguay and Cuba, from *Lasiurus borealis bonariensis* and *Lasiurus pfeifferi*.

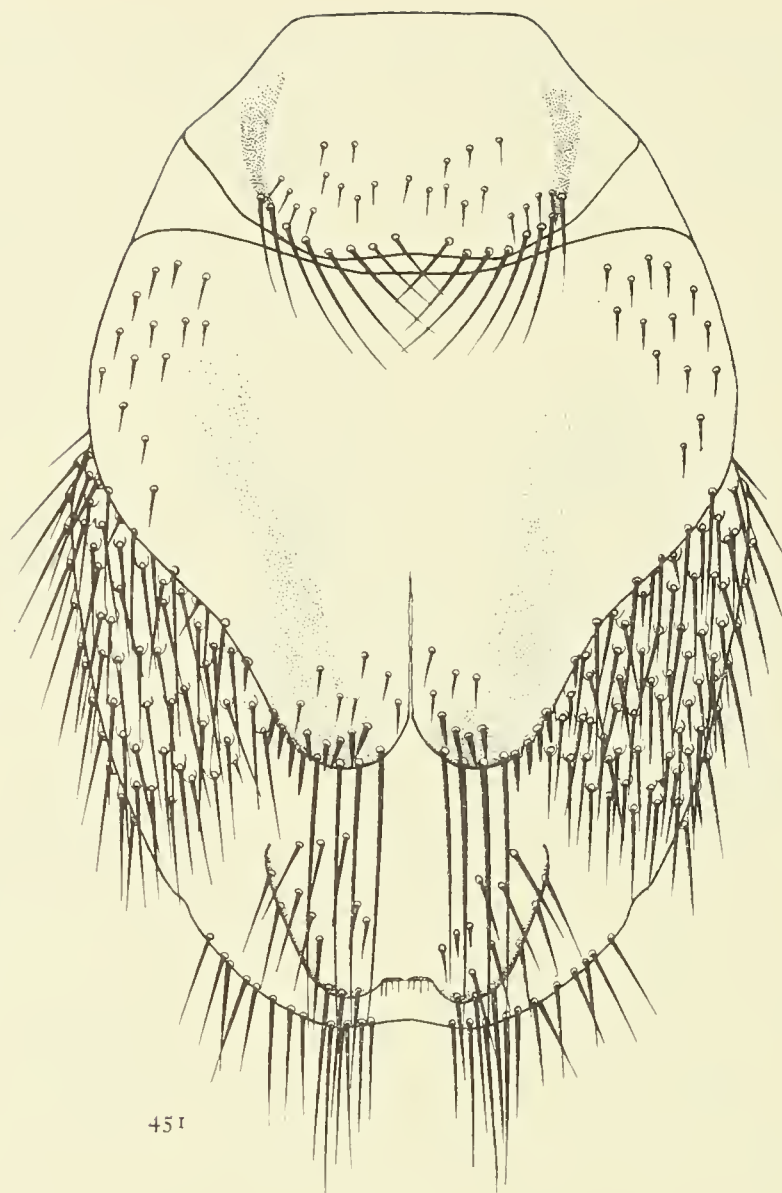
MATERIAL IN THE COLLECTION

BRAZIL

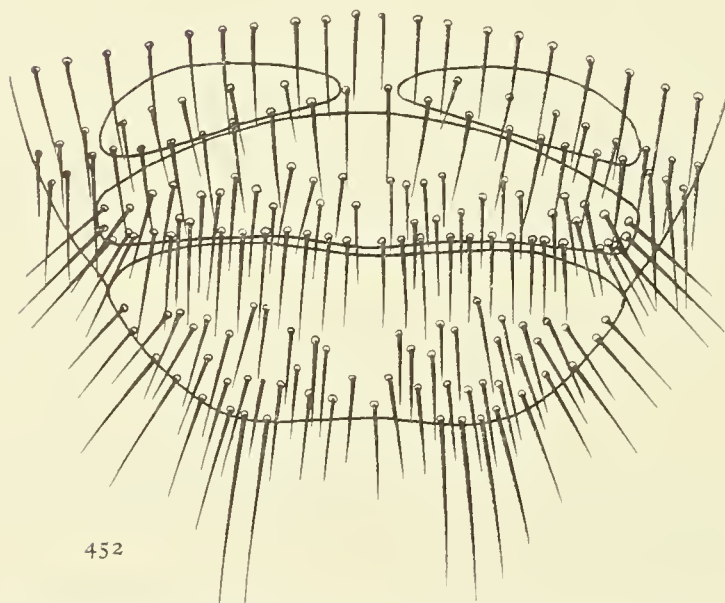
One female from the Museum in Rio de Janeiro, no further data, Miranda Ribeiro, figured by Scott.  
Nova Teutonia, from bat no. 1, 10.vii. 1938, F. Plau-  
mann, 1 ♂.

PARAGUAY

Sapucay, 1901, W. Foster, N. C. Rothschild, 1 ♀.



451



452

Figs. 451, 452. *Basilia ferruginea* Miranda Ribeiro. Female. 451. abdomen, dorsal; 452. same, ventral, posterior part.



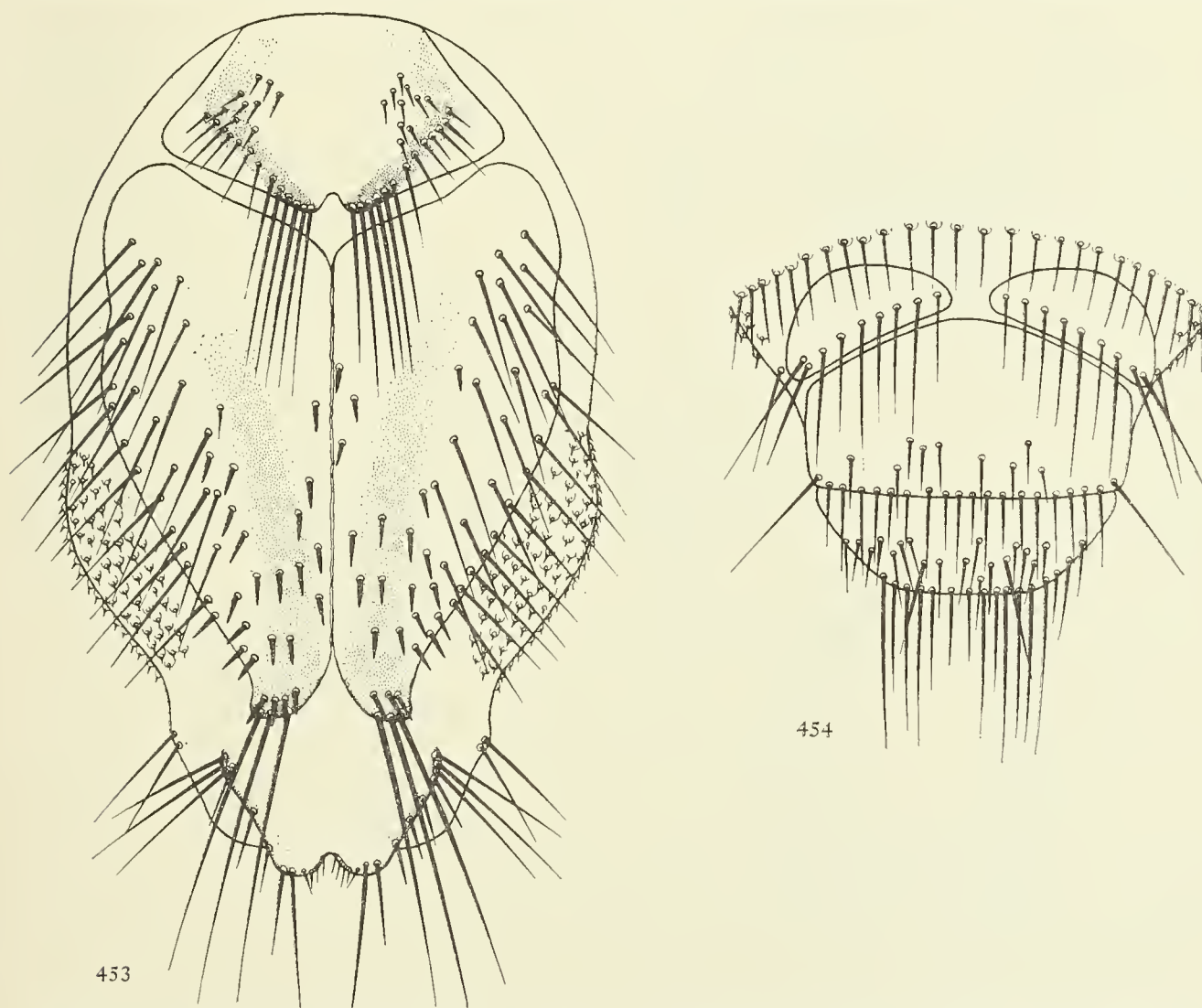
***Basilia bellardii* (Rondani, 1878)**

(Figs. 453, 454)

*Nycteribia bellardii*. Rondani, 1878, *Ann. Mus. Civ. Stor. Nat. Genova*, **12**, 150.*Nycteribia mexicana*. Bigot, 1885, *Ann. Soc. Ent. France*, **5**, 225.*Penicillidia mexicana* Bigot. Speiser, 1902, *Zeitschr. syst. Hym. Dipt.* **2**, 172.*Basilia mexicana* Bigot. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479.nec *Basilia bellardii* Rondani. Speiser, 1901, *Arch. Naturgesch.* **67**, 11 (refers to *B. speiseri*).nec *Basilia bellardii* Rondani. Schuurmans Stekhoven, 1931, *Zeitschr. Parasitenk.* **3**, 205.nec *Basilia bellardii* Rondani. Hase, 1931, *Zeitschr. Parasitenk.* **3**, 220.nec *Basilia bellardii* Rondani. Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117. (The last 3 references refer to *B. myotis*.)*Basilia mexicana mexicana* Bigot. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1 (*pro parte*).*Basilia bellardii* Rondani. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

Head with 6 setae at the anterior dorsal margin and 2 pairs of setae between the eyes. Mesonotum with a short, triangular process posteriorly. 9–10 notopleural setae.

*Female abdomen.* Tergite 1 triangular, with 2 groups of 5–6 setae each posteriorly. Tergal plate 2 triangular, with 2 posterior processes with sharp external corners which bear 3 long setae and 3–4 spines. Lateral parts of the surface covered with long setae and with some spines in the



Figs. 453, 454. *Basilias bellardii* (Rondani). Female. 453. abdomen, dorsal; 454. same, ventral, posterior part.

middle posteriorly. Pleurae covered with short spines. Anal segment conical, with setae at the posterior processes and several short setae laterally. Abdominal ctenidium with 62 spines. Sternite 5 with broad semicircular sclerites which are placed obliquely. Sternite 6 undivided, truncate triangular. Sternite 7 rounded, shorter than 6.

Male unknown.

Distribution: Mexico.

MATERIAL IN THE COLLECTION

One ♀, type of *B. mexicana* Bigot.

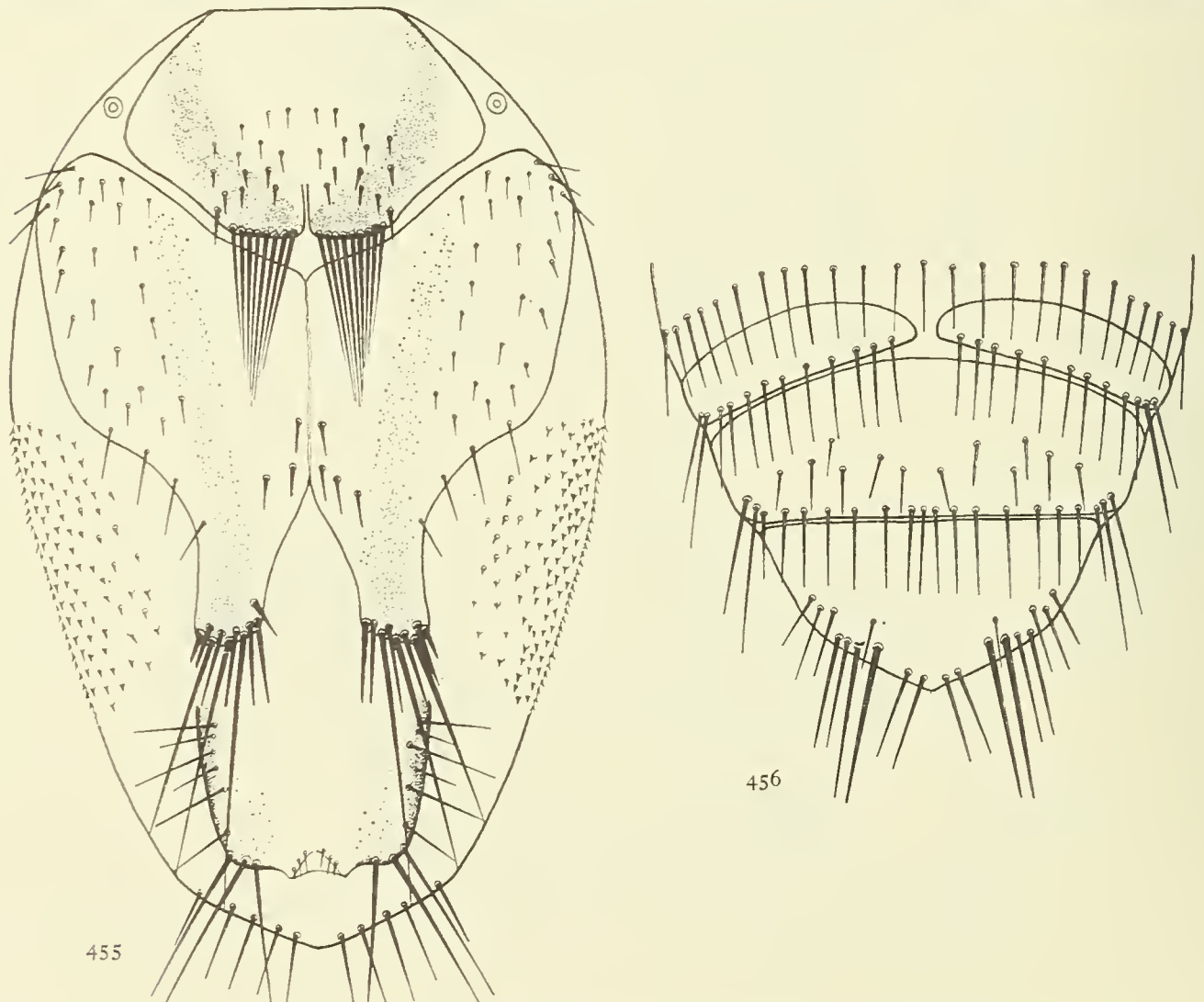
***Basilias bequaerti* Guimarães & d'Andretta, 1956**

(Figs. 418, 433, 455, 456)

*Basilias bequaerti*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Head with 6 setae at the anterior dorsal margin and 2 between the eyes. 8-10 notopleural setae. Mesonotum of female with a finger-shaped process posteriorly.

*Male abdomen*. Tergites with single marginal rows. Tergite 2 with a row of short setae on the



Figs. 455, 456. *Basilias bequaerti* Guimarães & d'Andretta. Female. 455. abdomen, dorsal; 456. same, ventral, posterior part.

surface, tergites 3–6 bare. Sternite 5 with a group of 16–18 spines in 2 rows, 6–8 longer spines in the posterior row.

*Genitalia.* Aedeagus short and wide, serrated dorsally and ventrally, with the apical end turned up and tapering to a rounded tip. Parameres with triangular, slightly curved apical end.

*Female abdomen.* Tergite 1 with 2 groups of 8–10 long, closely placed setae with a narrow incision between them posteriorly. Tergal plate 2 heart-shaped, with 2 posterior processes which are parallel-sided and bear 3 long setae and a row of 6–7 very long spines. Surface with short hairs laterally and with some long spines in the middle posteriorly. Pleurae with minute spines. Anal segment parallel-sided, with long setae posteriorly and short setae laterally. Abdominal ctenidium with about 60 spines. Sternite 5 with narrowly elliptical sclerites which reach the midline. Sternite 6 undivided, nearly rectangular, slightly convex anteriorly. Sternite 7 longer than 6, triangular, with the apex posteriorly. Genital plate with 6 setae. Anal sclerite small, not connected with the genital plate, with 2 setae. Adanal plates small, with 3 setae.

Distribution and hosts: Paraguay, Colombia, Venezuela, from *Eptesicus brasiliensis*, *Micronycteris megalotis*.

## MATERIAL IN THE COLLECTION

## PARAGUAY

Sapucay, from *Eptesicus brasiliensis*, 10.vi. 1901, W. Foster, N. C. Rothschild, ♀ holotype, 1 ♂ 6 ♀ paratypes.

## HOST SYNONYMY

<i>Name on original label</i>	<i>Current name</i>
<i>Histiopus dorianus</i> Dobson.	<i>Eptesicus brasiliensis</i> Desmarest.

***Basilias boardmanni* Rozeboom, 1934**

(Figs. 417, 457, 458)

*Basilias boardmanni.* Rozeboom, 1934, *Jour. Parasit.* **20**, 315.

*Basilias boardmanni* Rozeboom. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

*Basilias boardmanni* Rozeboom. Peterson, 1960, *Proc. Ent. Soc. Ontario*, **90**, 30.

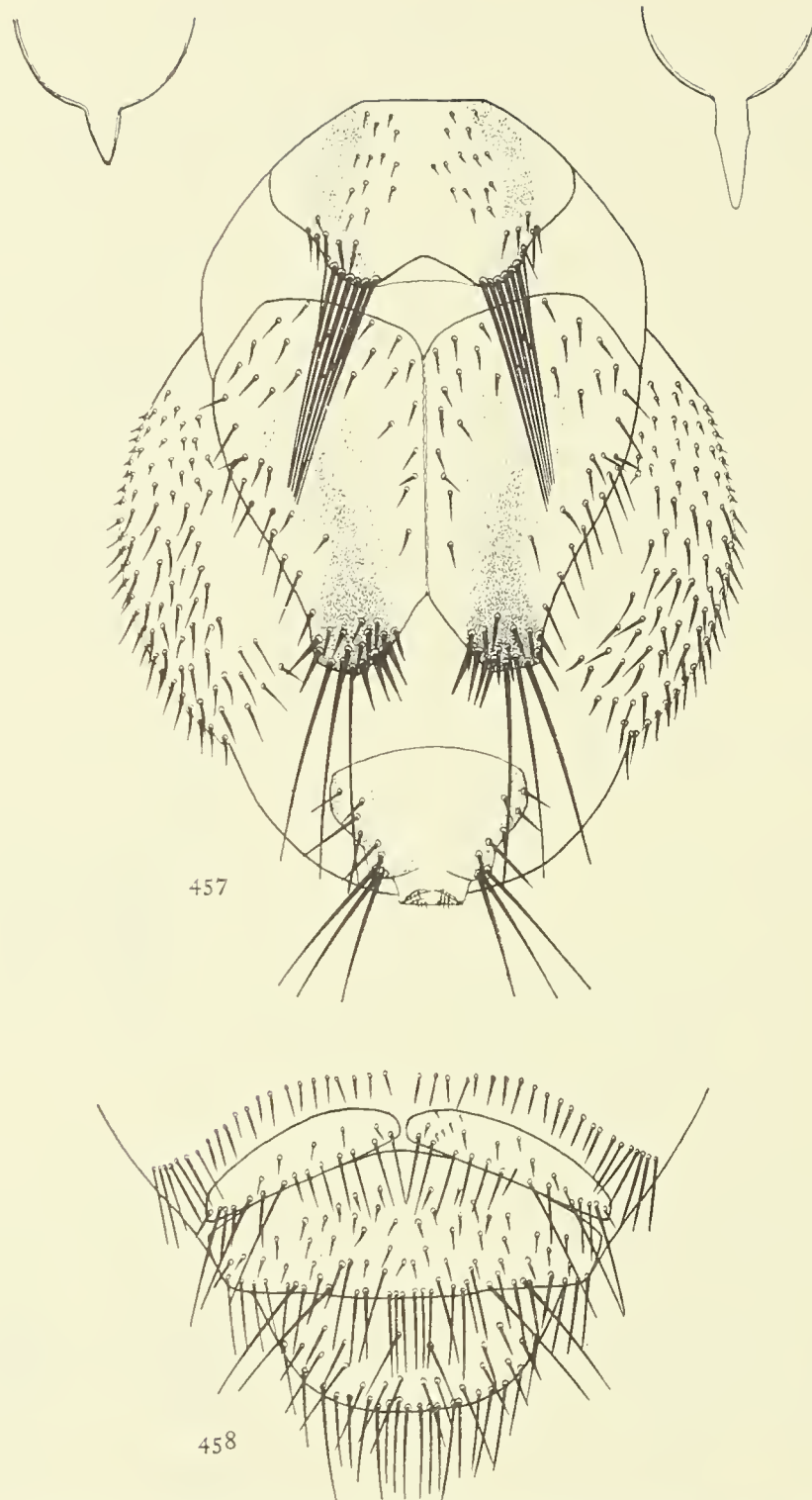
Head with about 10 setae at the anterior dorsal margin and 10 setae between the eyes, reaching beyond them posteriorly. 10–12 notopleural setae. Mesonotum of female with a long, finger-shaped process posteriorly.

*Male abdomen.* Very broad and hairy. Tergites short, with double marginal rows. Tergite 2 covered with short setae, only a few hairs on tergite 3. Sternite 5 with about 40 spines in 2–3 rows.

*Genitalia.* Aedeagus long and narrow, parallel-sided with rounded end, slightly curved at the base. Parameres with blunt end.

*Female abdomen.* Tergite 1 with 2 groups of 6–8 long setae posteriorly, separated by a wide concavity. Tergal plate 2 heart-shaped with broadly rounded posterior processes which bear 4 long setae and some very long and some shorter spines. 2 triangular dark stripes run from the posterior processes into the middle of the lateral sclerites. Anal segment conical, with setae posteriorly and laterally. Pleurae with minute spines anteriorly and short setae posteriorly. Abdominal ctenidium with 60 spines. Sternite 5 with narrow, elliptical, obliquely placed





Figs. 457, 458. *Basilia boardmanni* Rozeboom. Female. 457. abdomen, dorsal, with posterior process of mesonotum; 458. same, ventral, posterior part.

sclerites. Sternite 6 undivided, triangular. Sternite 7 trapezoidal, shorter than sternite 6. Genital plate with 10-12 setae. Anal sclerite absent or represented by a single seta. Adanal plates triangular, with 2-3 longer and a few short setae.

Distribution and hosts: Florida, Illinois, Georgia, from *Myotis austroriparius*, *M. lucifugus*.

## MATERIAL IN THE COLLECTION

## U.S.A.

Florida, Bat Cave near Alachua Co., Newberry, from *Myotis austroriparius*, 14.vii. 1953, D. W. Rice, 1 ♂ 1 ♀.

***Basilias corynorhini* (Ferris, 1916)**

(Figs. 415, 436, 459, 460)

*Penicillidia corynorhini*. Ferris, 1916, *Ent. News*, **27**, 433.

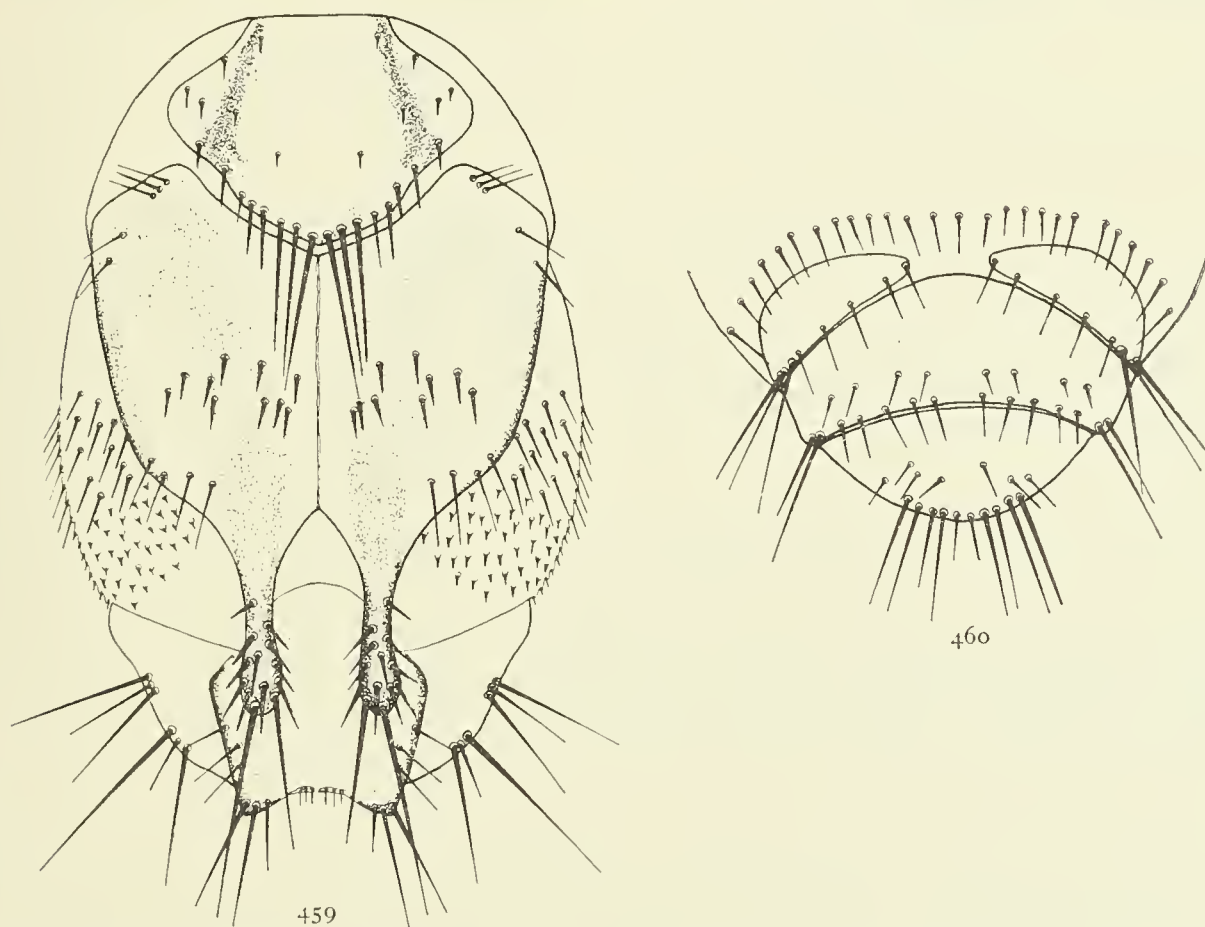
*Basilias corynorhini* (Ferris). Ferris, 1924, *Ent. News*, **35**, 191.

*Basilias corynorhini* (Ferris). Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

*Basilias corynorhini* (Ferris). Peterson, 1960, *Proc. Ent. Soc. Ontario*, **90**, 30.

Head with 4–6 setae at the anterior dorsal margin, and 1–2 between the eyes. 8–10 notopleural setae.

*Male abdomen*. Tergites with single marginal rows. A few scattered short hairs on the surface



Figs. 459, 460. *Basilias corynorhini* (Ferris). Female. 459. abdomen, dorsal; 460. same, ventral, posterior part.

of tergite 2, tergites 3–6 bare. Anal segment covered with short setae in the posterior half of the dorsal surface. Sternite 1 + 2 short, with a ctenidium of 55 spines. Sternite 4 with a marginal row of short setae and 4 vertical long setae. Surface bare. Sternite 5 longer, with a group of about 18 spines in 2 rows at the posterior margin.

*Genitalia*. Aedeagus short, slightly tapering to a rounded end, without serrations. Parameres

with rounded apical end. These genitalia have been described by Guimarães (1956) for *Basilia* sp.d., p. 126 (Fig. 212).

*Female abdomen.* Tergite 1 rounded posteriorly, with a row of setae which are longest in the middle. Tergal plate 2 broad, with long, slender posterior processes with 2 long setae at the end and 8–10 spines along the stem. A transverse group of spines in the middle of the surface and a few short setae in the anterior lateral corners. Pleurae with short setae anteriorly and minute spines posteriorly. Anal segment slightly conical, with long setae posteriorly and short setae laterally. Sternite 5 with obliquely placed, semicircular sclerites. Sternite 6 undivided, rounded anteriorly. Sternite 7 shorter than sternite 6, rounded posteriorly. Genital plate with 4 setae. Anal sclerite with 2–4 setae, not connected with the genital plate. Adanal plates triangular, with 8–10 short setae.

Distribution and hosts: south-west of the U.S.A., east to Oklahoma, mainly from *Corynorhinus townsendii*, but also from species of *Antrozous*, *Plecotus* and *Pipistrellus*.

## MATERIAL IN THE COLLECTION

U.S.A.

Hot Boy Mine, Arizona, from *Corynorhinus townsendii*, 5.vii. 1960, A. Ross, 1 ♂ 1 ♀.

***Basilia neamericana* Schuurmans Stekhoven, 1951**

*Basilia neamericana.* Schuurmans Stekhoven, 1951, *Acta Zool. Lilloana*, 12, 101

According to Guimarães & d'Andretta (1956), this species is very closely related to *B. plaumanni* and *B. silvae*. Argentine, from *Eptesicus furinalis*.

No material examined.

***Basilia plaumanni* Scott, 1940**

(Figs. 416, 434, 461, 462)

*Basilia plaumanni.* Scott, 1940, *Proc. Roy. Ent. Soc. Lond. B*, 9, 57.

*Basilia mexicana mexicana* Bigot. Guimarães, 1946, *Arq. Zool. São Paulo*, 5, 1.

*Basilia mexicana plaumanni* Scott. Guimarães, 1946, *ibid.*

*Basilia plaumanni* Scott. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

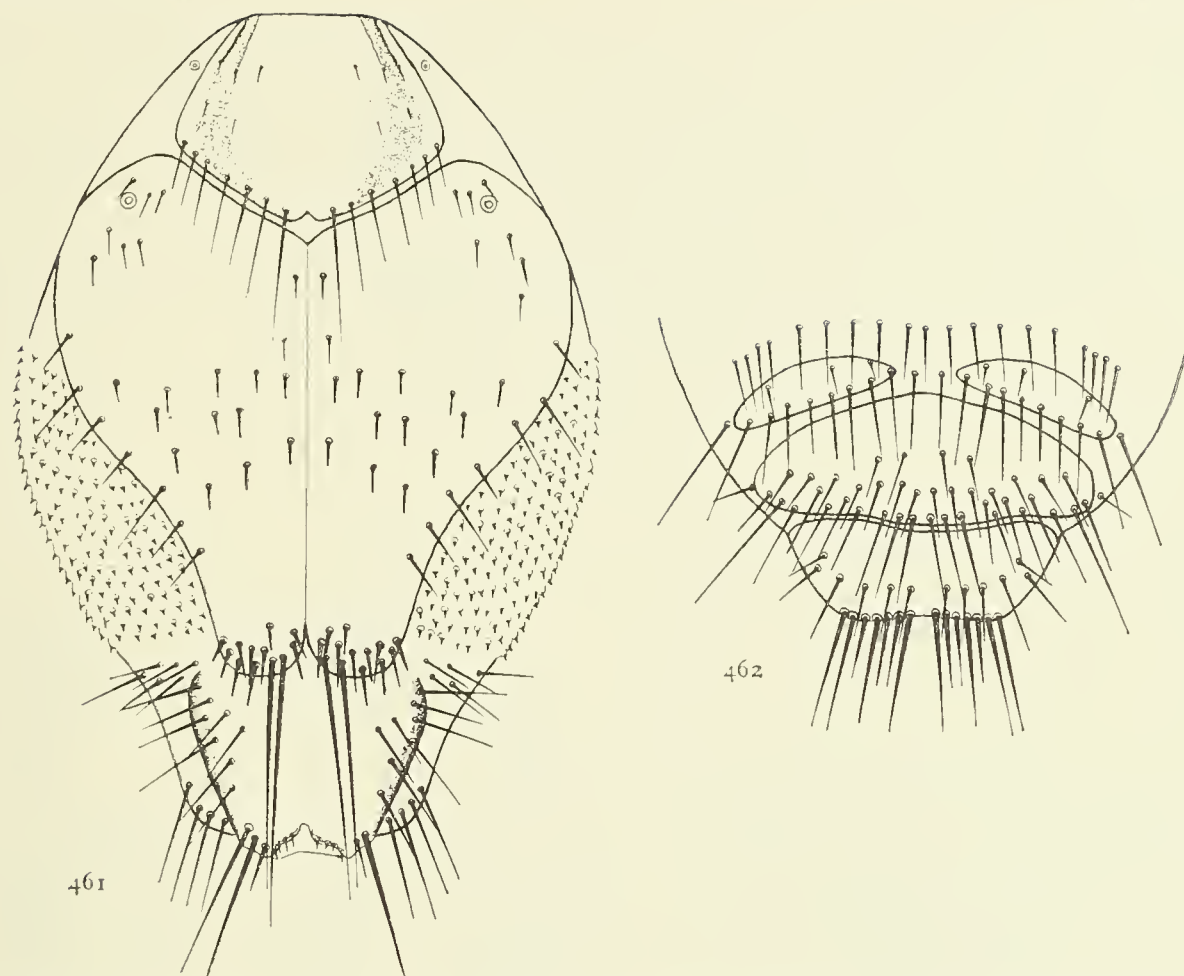
Head with 4–6 setae at the anterior dorsal margin and 2 setae between the eyes. 8–10 notopleural setae. Mesonotum of female with a triangular elevation posteriorly, which is absent in some specimens.

*Male abdomen.* Tergites with single marginal rows. Tergite 2 with short hairs on the surface, tergites 3–6 bare. Sternite 5 with a group of about 25 spines in 2 rows, those of the posterior row longer and more widely spaced.

*Genitalia.* Aedeagus parallel-sided, serrated dorsally, with a sharp, ventral, apical tooth. Parameres with a rounded, triangular apical end.

*Female abdomen.* Tergite 1 with a row of short, thin setae at the rounded posterior margin. Tergal plate 2 large, heart-shaped, with broadly rounded posterior processes, which bear 3 long setae and 10–15 short spines. Surface with short hairs in the middle and anteriorly in the lateral





Figs. 461, 462. *Basilia plaumanni* Scott. Female. 461. abdomen, dorsal; 462. same, ventral, posterior part.

corners. Anal segment conical, with 1-2 longer setae posteriorly and short setae laterally. Pleurae covered with minute spines. Sternite 5 with obliquely placed narrowly elliptical sclerites. Sternite 6 undivided, triangular. Sternite 7 shorter than 6, trapezoidal or rounded posteriorly. Genital plate with 2-4 long setae. Anal sclerite small, with 2 setae, not connected with the genital plate. Adanal plates triangular, with rounded posterior margin, with 4-5 short setae.

Distribution and hosts: Brazil, Paraguay, Argentina, mainly from *Histiotus velatus*, rarely from other species of *Histiotus* and *Myotis*.

#### MATERIAL IN THE COLLECTION

##### BRAZIL

Nova Teutonia, St Catarina, from *Histiotus velatus*, 21.vii. 1938, F. Plaumann, ♀ holotype, 1 ♂ paratype.

São Paulo, Ypiranga, from *Histiotus velatus*, L. R. Guimarães, 1 ♀.

Palmeira, Grillo, Parana, from *Eptesicus fuscus*, Genoa Museum, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

A series of 4 ♂ 4 ♀, without locality, date or host, collected by P. Simmons, which according to Guimarães & d'Andretta (1956) are possibly a subspecies of *B. plaumanni*.

#### ***Basilia rondanii* Guimarães & d'Andretta, 1956**

(Figs. 414, 463, 464)

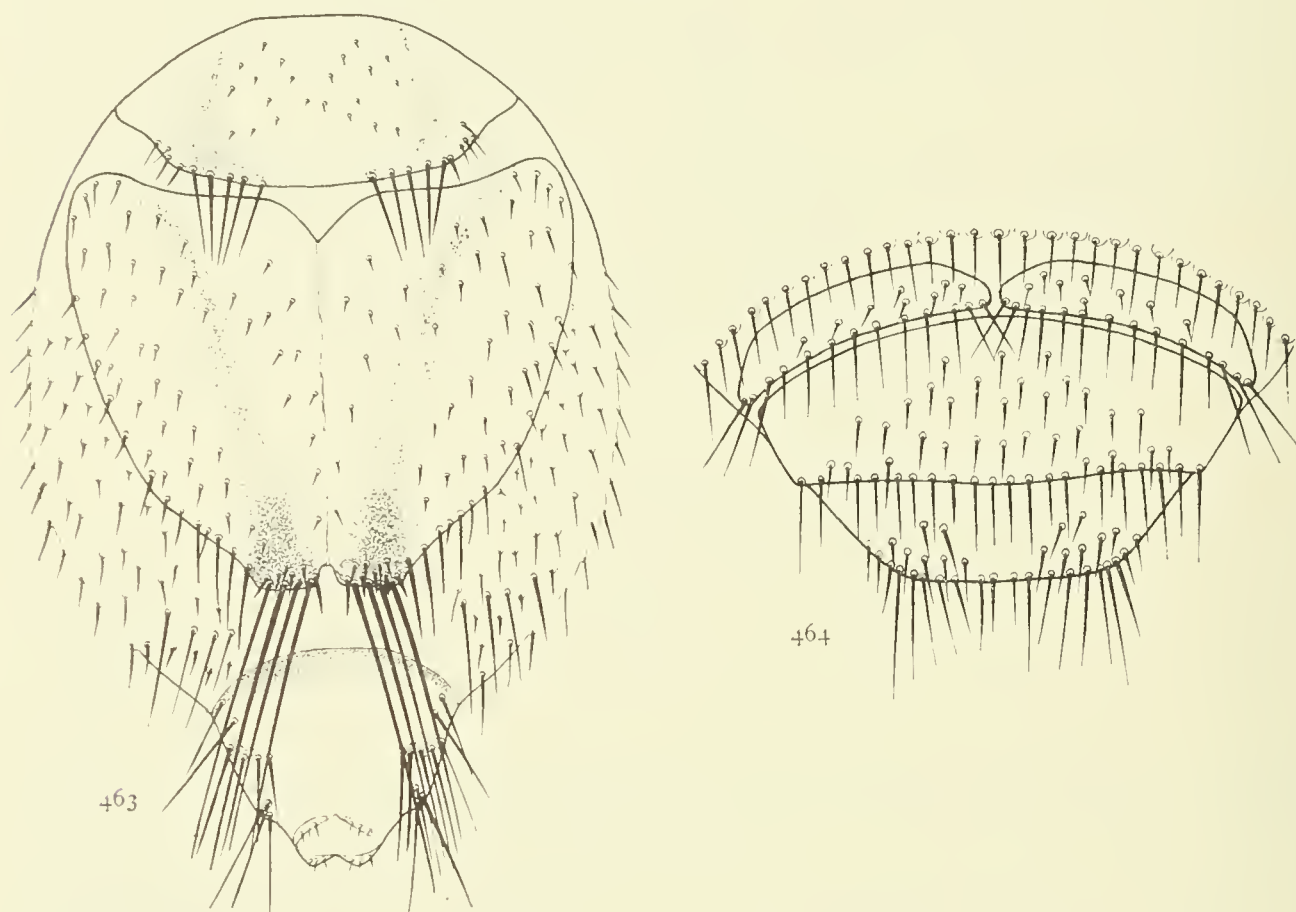
*Basilia rondanii*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

*Basilia rondanii* Guimarães & d'Andretta. Peterson, 1960, *Proc. Ent. Soc. Ontario*, 90, 30.

Head with 8-10 setae at the anterior dorsal margin and 2-4 setae between the eyes. 12-14 notopleural setae. Mesonotum of female with a finger-shaped process posteriorly.

*Male abdomen.* Tergites with single marginal rows. Tergite 2 with hairs on the surface, tergites 3-6 bare. Sternite 5 with about 30 spines in 2-3 rows at the posterior margin, those of the posterior row longer and more widely spaced.

*Genitalia.* Aedeagus short, wide, parallel-sided, with a triangular end with the apex ventral. Parameres with rounded base and a short triangular apical end.



Figs. 463, 464. *Basilium rondanii* Guimarães & d'Andretta. Female. 463. abdomen, dorsal; 464. same, ventral, posterior part.

*Female abdomen.* Tergite 1 with a row of setae with a wide gap in the middle at the posterior margin. Tergal plate 2 heart-shaped, with rounded posterior processes with 4 long setae and some spines. Short setae on the surface. Anal segment broadly conical, with long setae posteriorly and 2 transverse rows of setae in the middle at each side. Anterior dorsal margin pigmented. Pleurae with short spines anteriorly and longer setae posteriorly. Abdominal ctenidium with 65 spines. Sternite 5 with narrowly elliptical, obliquely placed sclerites which reach the midline. Sternite 6 triangular. Sternite 7 not longer than 6, rounded posteriorly. Genital plate with 4 setae. Anal sclerite with 2 long setae, connected by a sclerotized strip with the genital plate. Adanal plates broad, triangular, rounded posteriorly, with 3 longer and 1-2 shorter setae.

Distribution and hosts: southern parts of the U.S.A., Texas, Guatemala, Mexico, Honduras,

mainly from *Myotis nigricans*, more rarely from other species of *Myotis*, from *Artibeus* and *Hylonycteris*.

***Basiliasilvae* (Brèthes, 1913)**

(Figs. 420, 435, 465, 466)

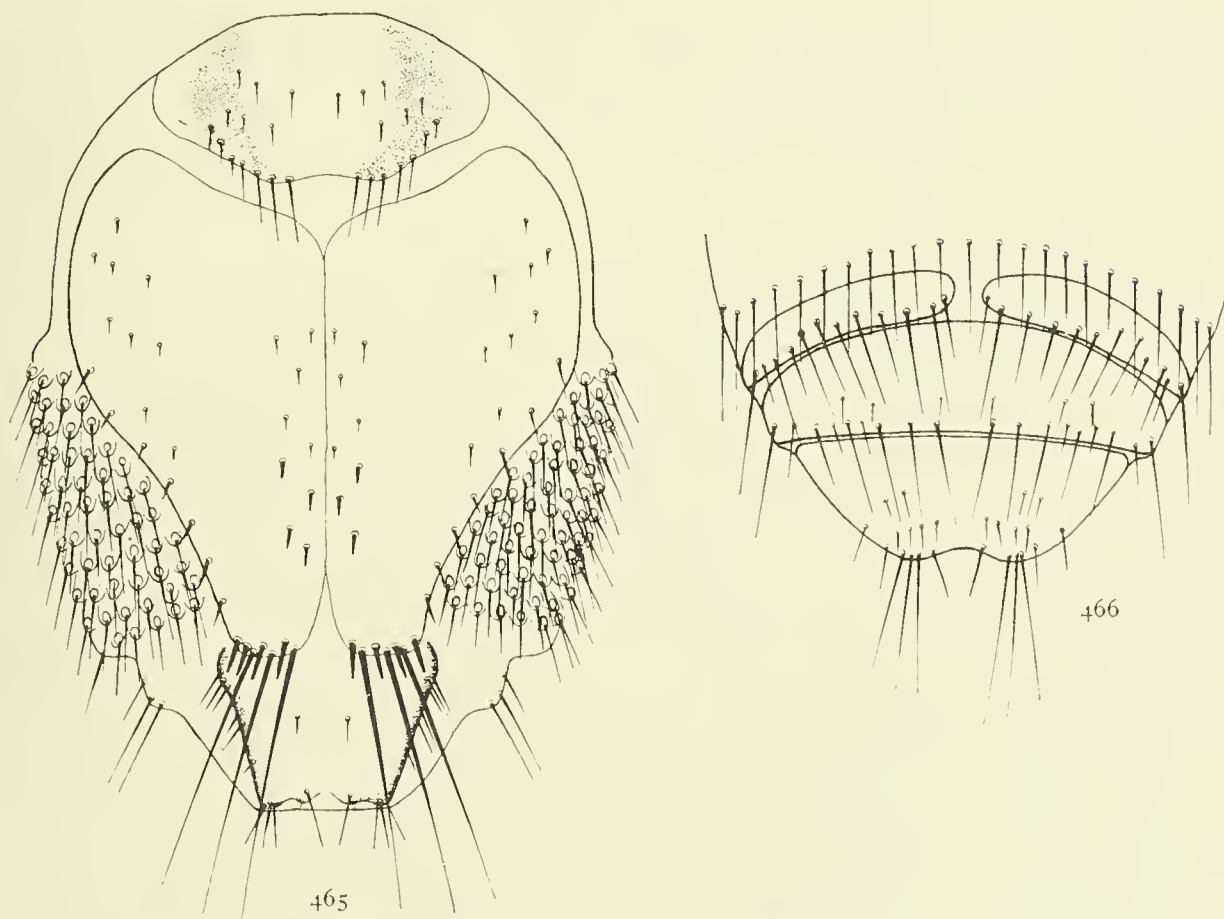
*Cyclopodia silvae*. Brèthes, 1913, *Bol. Mus. Nac. Chile*, **5**, 297.

*Basiliasilvae* Brèthes. Ferris, 1924, *Ent. News*, **35**, 191.

*Basiliasilvae mexicana silvae* Brèthes. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.

*Basiliasilvae* Brèthes. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

Head with 6 setae at the anterior dorsal margin and 2 between the eyes. 8–10 notopleural setae.



Figs. 465, 466. *Basiliasilvae* (Brèthes). Female. 465. abdomen, dorsal; 466. same, ventral, posterior part.

**Male abdomen.** Tergites with single marginal rows of thin setae. Tergite 2 with short hairs on the surface, tergites 3–6 bare. Sternite 5 with a group of about 20 spines, arranged in 2 rows.

**Genitalia.** Aedeagus very short, parallel-sided, without serrations, with a short ventral process near the apex. Parameres with short triangular end with rounded tip.

**Female abdomen.** Tergite 1 rounded posteriorly, with a row of short setae with a gap in the middle. Tergal plate 2 heart-shaped, with rounded posterior processes which bear 3 long setae and a few spines. Surface with short setae laterally and along the midline. Anal segment conical, with short setae laterally and posteriorly. Pleurae covered with short setae. Sternite 5



with narrow lateral sclerites which reach the midline. Sternite 6 undivided, very short, slightly convex anteriorly. Sternite 7 rounded posteriorly, not longer than 6. Genital plate with 4 setae. Anal sclerite small, isolated, with 2 setae, or sclerite absent. Adanal plates small, rounded, with about 4 short setae.

Distribution and hosts: Chile, from *Myotis chiloensis atacamensis*, rarely from other bats.

## CHILE

## MATERIAL IN THE COLLECTION

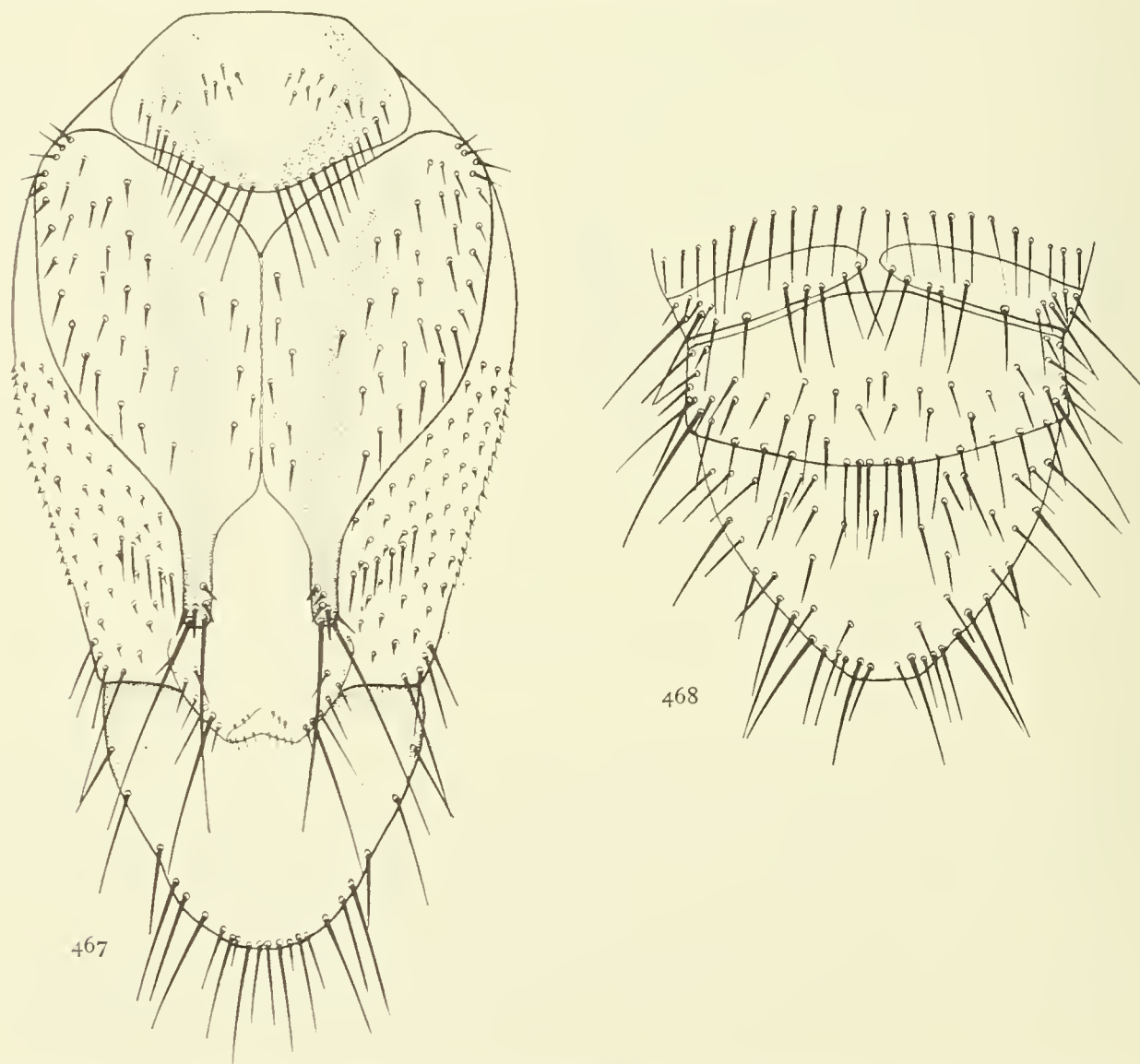
Coquimbo, Paihuana, from *Myotis chiloensis atacamensis*, 23.xi. 1923, C. C. Sanborn, 1 ♀.

***Basilias wenzeli*** Guimarães & d'Andretta, 1956

(Figs. 419, 467, 468)

*Basilias wenzeli*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1

Head with 4 setae at the anterior dorsal margin and 2 between the eyes. 8–10 notopleural setae. Mesonotum of female with a triangular posterior process.



Figs. 467, 468. *Basilias wenzeli* Guimarães & d'Andretta. Female. 467. abdomen, dorsal; 468. same, ventral, posterior part.

*Male abdomen.* Tergites with single marginal rows. Tergite 2 with a row of short setae on the surface, tergites 3–6 bare. Sternite 5 with a group of 22 short spines in 2 rows.

*Genitalia.* Aedeagus slender, slightly curved, without serrations, tapering to a rounded, up-turned tip. Parameres with triangular apical end.

*Female abdomen.* Tergite 1 with a row of short setae with a small gap in the middle at the rounded posterior margin. Tergal plate 2 with long, slender posterior processes, with 2 setae at the tip and 2–4 short spines. Stem of the processes bare. Surface with short hairs laterally and along the midline. Anal segment short, conical, with 1–2 long setae posteriorly and short setae laterally. Pleurae with short spines and a row of longer setae anterior to the anal segment. Sternite 5 with 2 narrow, transverse sclerites. Sternite 6 undivided, nearly rectangular, slightly convex anteriorly. Sternite 7 very long, triangular, reaching far beyond the anal segment posteriorly. Genital plate with 4 short setae. Anal sclerite with 2 short setae, connected with the genital plate by a narrow sclerotized strip. Adanal plates triangular, with 3–4 setae posteriorly.

Distribution and hosts: Colombia, Venezuela, from *Eptesicus fuscus*, *Histiotus* sp. and *Lonchorhina aurita*.

#### SPEISERI GROUP

#### ***Basilias carteri* Scott, 1936**

(Figs. 421, 437, 469, 470)

*Basilias carteri.* Scott, 1936, *Jour. Linn. Soc. Zool.* **39**, 479.

*Basilias carteri* Scott. Scott, 1940, *Proc. Ent. Soc. Lond.* **9**, 57.

*Basilias romanai.* del Ponte, 1944, *Ann. Inst. Med. Regional, Tucuman*, **1**, 117.

*Basilias carteri* Scott. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.

*Basilias carteri* Scott. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

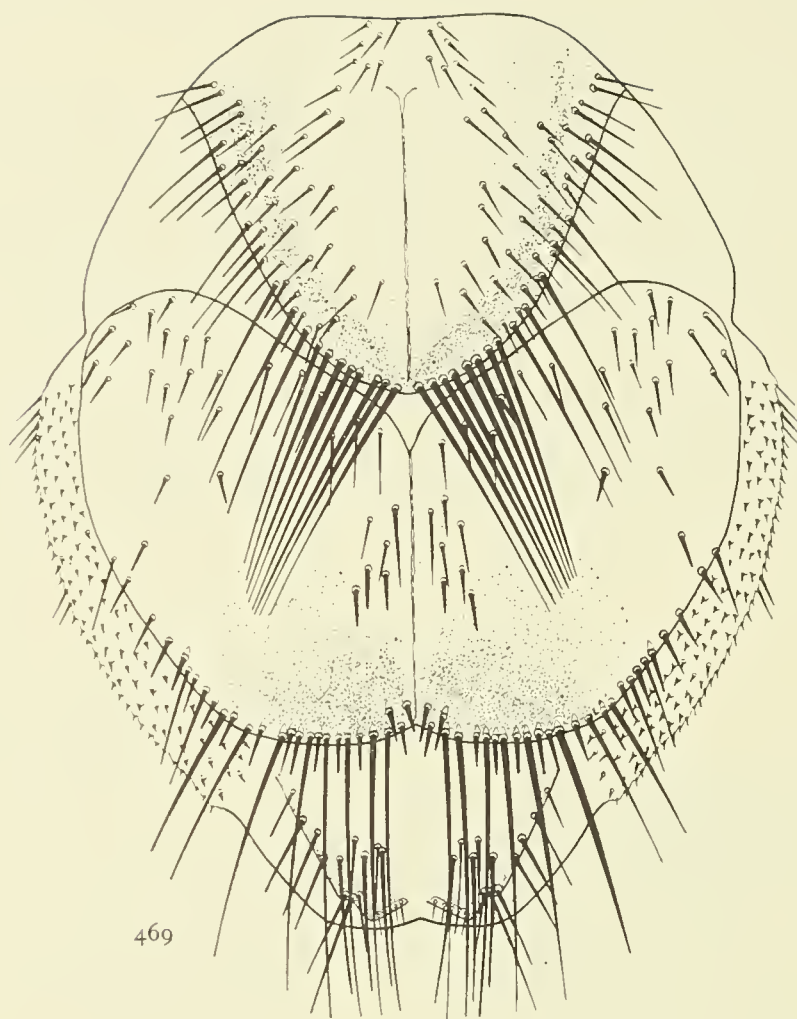
Head with 4 setae at the anterior dorsal margin and between the eyes. 12–15 notopleural setae.

*Male abdomen.* Marginal rows of the tergites double. Tergite 2 with a row of short setae on the surface, tergites 3–6 bare. Sternite 4 with a marginal row of long setae. Sternite 5 with a group of about 25 spines in 2 rows, those of the posterior row longer.

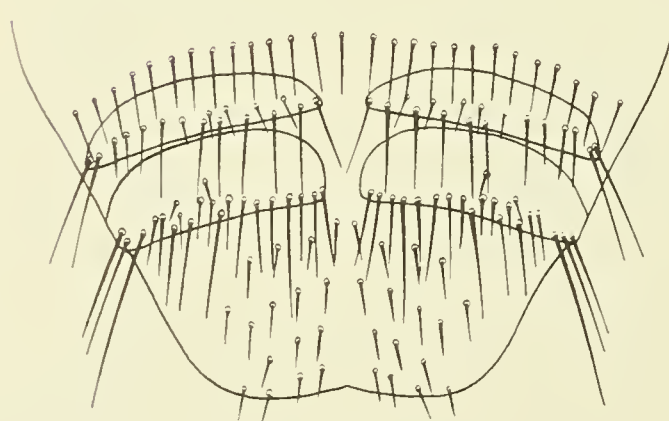
*Genitalia.* Aedeagus short and wide, serrated dorsally, parallel-sided or widening slightly apically, with a sharp ventral apical tooth. Parameres large, triangular, with rounded tip.

*Female abdomen.* Tergite 1 broadly rounded posteriorly with a row of 12–16 long setae in the middle and shorter setae at the lateral margins and at the sides of the surface. Tergal plate 2 broadly rounded, divided into roughly elliptical lateral sclerites; 4–6 long setae in the middle of the posterior margin alternating with spines; shorter setae laterally; surface with short setae anteriorly and in the middle. Pleurae covered with minute spines. Anal segment broadly conical, with long setae posteriorly and short setae laterally. Sternites 5 and 6 both with parallel-sided lateral sclerites, those of sternite 6 longer. Sternite 7 trapezoidal, as long as sternites 5 and 6 together. Genital plate with 6–8 setae, connected by a triangular sclerotized strip with the anal sclerite which bears 2 setae. Adanal plates long, triangular, with 5–6 setae.

Distribution and hosts: Argentine, Paraguay, Brazil, Bolivia, from *Molossops temmincki*, *Myotis albescens*, *Eptesicus brasiliensis*, *Myotis nigricans* and others.



469



470

Figs. 469, 470. *Basilia carteri* Scott. Female. 469. abdomen, dorsal; 470. same, ventral, posterior part.



MATERIAL IN THE COLLECTION

PARAGUAY

Makthlawaya, Chaco, from *Molossops temmincki*, 20.i. 1927, G. S. Carter, H. Scott, ♀ holotype, 2 ♂ 1 ♀ paratypes (Brit. Mus. 1936.99).  
Sapucay, from *Eptesicus brasiliensis*, 1905, W. Foster, N. C. Rothschild, 1 ♂ 3 ♀.  
Tacuaras, from *Myotis albescentis*, 12.xi. 1900, W. Foster, N. C. Rothschild, 2 ♂ 2 ♀.

BRAZIL

Santa Catarina, Nova Teutonia, from *Myotis albescentis*, 29.viii. 1938, F. Plaumann, 2 ♂ 2 ♀; 10.vii. 1938, 1 ♂.

BOLIVIA

St Cruz de la Sierra, from *Myotis nigricans*, Steinbach N. C. Rothschild, 1 ♂.

HOST SYNONYMY

Name on original label

Current name

*Histiotus dorianus* Dobson or  
*Vespertilio dorianus* Dobson.

*Eptesicus brasiliensis* Desmarest.

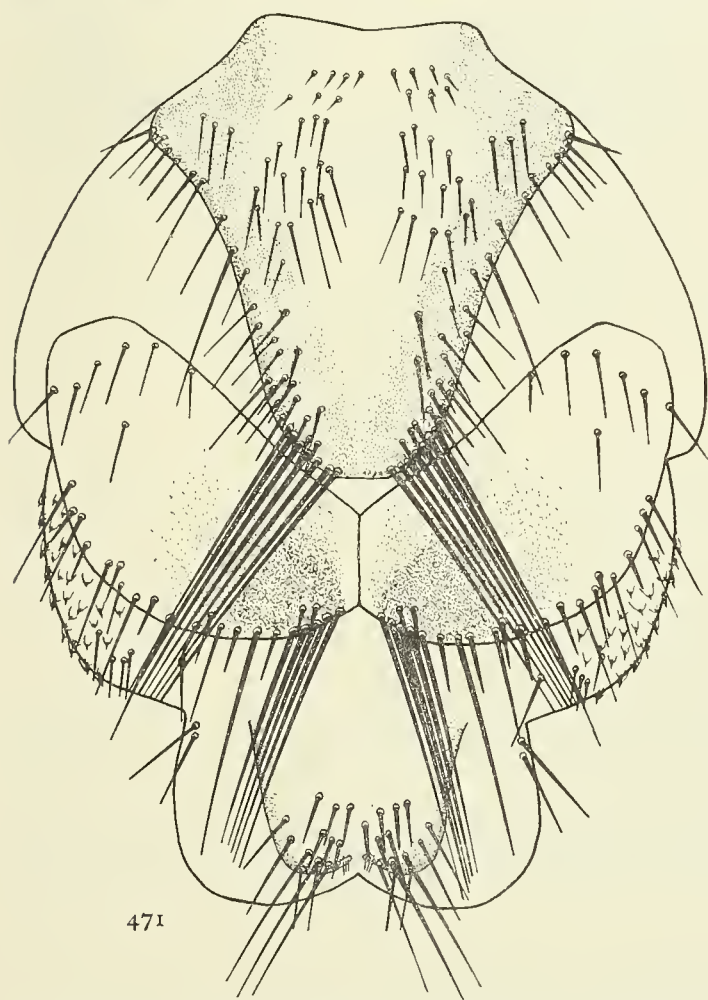
***Basilia constricta* Guimarães & d'Andretta, 1956**

(Figs. 426, 438, 471, 472)

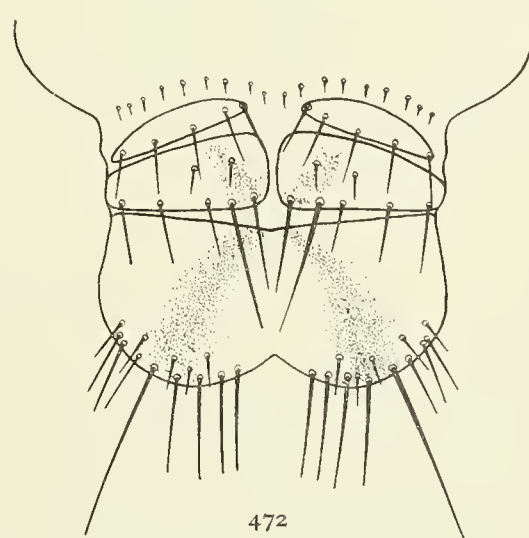
*Basilia constricta*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Head with 4–6 setae at the anterior dorsal margin. 8–10 notopleural setae.

*Male abdomen*. Tergites with single marginal rows. Tergite 2 with a row of short setae on the surface, tergites 3–6 bare. Sternite 5 with a group of about 20 spines in 2 rows at the posterior



471



472

Figs. 471, 472. *Basilial constricta* Guimarães & d'Andretta. Female. 471. abdomen, dorsal; 472. same, ventral, posterior part.

margin, those of the posterior row longer and more widely spaced. An indentation in the middle of the posterior margin.

*Genitalia.* Aedeagus short, wide, parallel-sided, truncate, with serrations dorsally. Parameres with triangular apical end and a rounded tip.

*Female abdomen.* Tergite 1 long, triangular, with slightly concave sides and with rounded posterior margin which bears 2 groups of 8–10 closely placed setae. These setae are directed obliquely outwards. Surface covered with short setae anteriorly, leaving a median strip in the posterior part bare. Tergal plate 2 consisting of 2 elliptical plates which touch in the middle for a short distance. The posterior border of the tergal plate is indented in the middle and bears 6 long setae near the median line and shorter setae laterally. Surface with groups of short setae at the anterior lateral corners. Pleurae with a membranous fold in not very extended females and with minute spines posterior to this fold. Anal segment slightly conical, with long setae posteriorly and shorter setae laterally on the dorsal surface. Sternite 1 + 2 very large, with a ctenidium of about 60 spines. Sternite 4 with a row of short spines at the posterior margin. Sternite 5 with 2 small, narrowly elliptical sclerites which reach the midline. Sternite 6 with larger and wider transverse sclerites. Sternite 7 as long or longer than sternites 5 and 6 together, rectangular, with 2 rounded lobes posteriorly and a concavity between them. Genital plate with 6 setae, connected by a triangular sclerotized strip with the anal sclerite which bears two setae. Adanal plates large, triangular, with 4–6 setae posteriorly.

Distribution and hosts: Ecuador, Peru, Colombia, Venezuela, from *Myotis nigricans*, *Myotis albescens* and more rarely from several other species.

#### MATERIAL IN THE COLLECTION

##### ECUADOR

Gualaquiza, from *Myotis nigricans*, G. Hammond,  
W. F. H. Rosenberg, N. C. Rothschild, ♀ holotype,  
5 ♂ 7 ♀ paratypes.

##### VENEZUELA

Merida, N. C. Rothschild, 1 ♀ paratype.

### ***Basilia costaricensis* Guimarães & d'Andretta, 1956**

(Figs. 425, 439, 473, 474)

*Basilia costaricensis.* Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

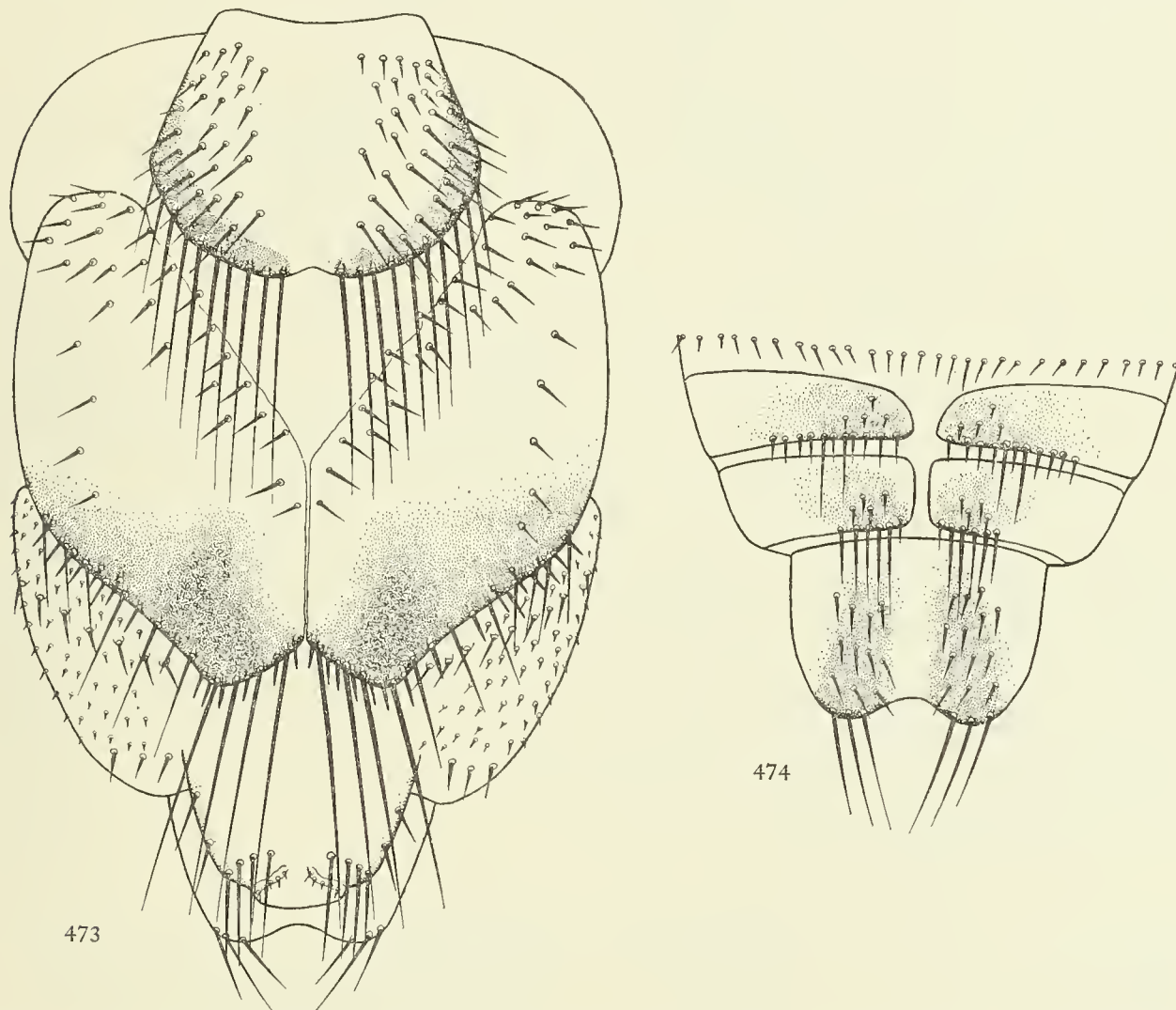
Head with 4–6 setae at the anterior dorsal margin and 2–4 between the eyes. 13–15 notopleural setae. Mesonotum with a small, triangular process posteriorly.

*Male abdomen.* Tergites with dense, double marginal rows. Tergite 2 with short setae on the surface, tergites 3–6 bare. Sternite 5 with a group of about 20 spines in 2 rows at the posterior margin.

*Genitalia.* Aedeagus wide, parallel-sided, with a tapering rounded end which is curved ventrally in the paratype examined, not rounded as shown in Fig. 146 of Guimarães & d'Andretta. Parameres triangular.

*Female abdomen.* Tergite 1 broadly rounded, with a row of long setae with a small gap in the middle at the posterior margin. Tergal plate 2 consisting of 2 rhomboidal plates, with the median parts of the posterior margin slightly produced. 4–5 long setae in the median part of the posterior

margin and short setae laterally. Surface with short setae along the anterior margin and laterally. Pleurae with minute spines and 2 rows of short setae. Anal segment slightly conical, with a row of moderately long setae posteriorly and short setae laterally. Sternite 1 + 2 very large, with a ctenidium of about 70 spines. Sternite 4 with a row of short spines at the posterior margin.



Figs. 473, 474. *Basilia costaricensis* Guimarães & d'Andretta. Female. 473. abdomen, dorsal; 474. same, ventral, posterior part.

Sternite 5 with transverse, parallel-sided, wide sclerites. Sternite 6 similar, but the sclerites are longer. Sternite 7 narrower than sternite 6, rectangular, with rounded posterior corners and median concavity of the posterior margin. Genital plate with 8 setae, connected by a long, narrow sclerotized strip with the anal sclerite which bears 2-3 short setae. Adanal plates long, elliptical, with 5-6 short setae.

#### MATERIAL IN THE COLLECTION

##### COSTA RICA

Bebedero, near Las Canas, 12.vi. 1930, Reimoser, 1 ♀ paratype.



**Basilia currani** Guimarães, 1943

(Figs. 428, 442, 475, 476)

*Basilia currani*. Guimarães, 1943, *Pap. Avuls. Dept. Zool.* **3**, 257.*Basilia carteri* Scott, var. Scott, 1940, *Proc. R. Ent. Soc. Lond. B.* **9**, 57.*Basilia currani* Guimarães. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.*Basilia currani*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.*Guimaraesia romana* del Ponte. Schuurmans Stekhoven, 1951, *Acta Zool.* **12**, 101.

Head with 4 setae at the anterior dorsal margin. 8–10 notopleural setae.

*Male abdomen*. Tergites with single marginal rows. Tergite 2 with a double row of short setae on the surface, tergites 3–5 with groups of short setae in the middle. Sternite 5 with a group of 20–25 spines in 2 rows, 8–10 in the anterior row, 12–15 in the posterior row.*Genitalia*. Aedeagus parallel-sided, truncate, without serrations. Parameres with a sharp triangular end.*Female abdomen*. Tergite 1 truncate triangular, with concave sides and 2 groups of 8–10 moderately long, closely placed setae posteriorly. Surface covered with short setae except in a median bare strip. Tergal plate 2 large, rounded posteriorly, with 3–4 moderately long setae and some spines near the midline and shorter, more widely spaced setae laterally; a small indentation in the middle of the posterior margin; short setae in the anterior part of the surface. Pleurae with minute spines and a few short setae posteriorly. Anal segment broadly conical, with a few short setae posteriorly and at the anterior part of the sides. Sternite 1 + 2 with a ctenidium of about 50 spines. Sternite 4 with a posterior row of short setae. Sternite 5 with narrowly triangular, obliquely placed lateral sclerites. Sternite 6 with larger triangular sclerites touching in the middle. Sternite 7 rounded posteriorly, shorter than 6. Genital plate with 10 closely placed setae and a broad sclerotized strip ending in a point before the anus. Anal sclerite absent. Adanal plates rounded posteriorly with 4–5 short setae.Distribution and hosts: Argentine, Brazil, from *Myotis ruber*, *Myotis chiloensis*, *Myotis albescens*, and several other species.

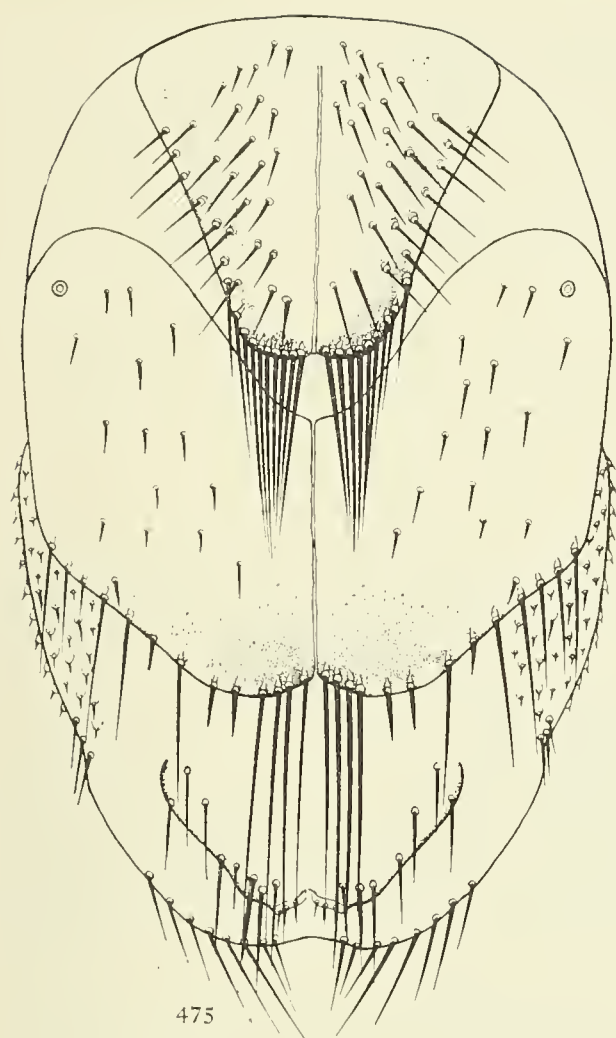
## MATERIAL IN THE COLLECTION

## BRAZIL

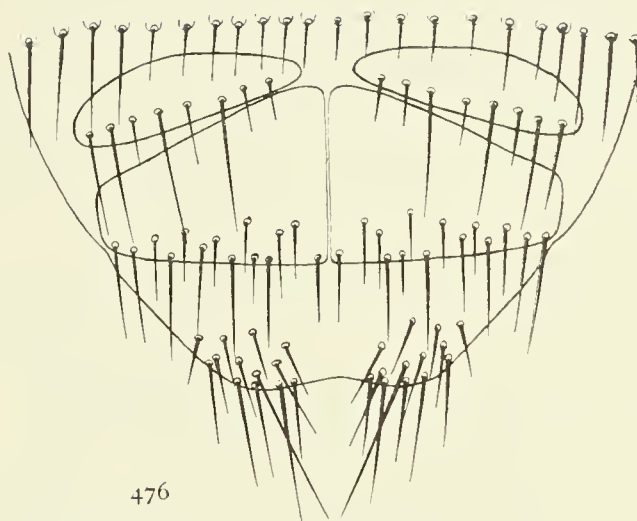
Santa Catarina, Nova Teutonia, from *Myotis albescens*, 29.vii. 1938, F. Plaumann, 5 ♂ 15 ♀.**Basilia dubia** Guimarães & d'Andretta, 1956

(Fig. 423)

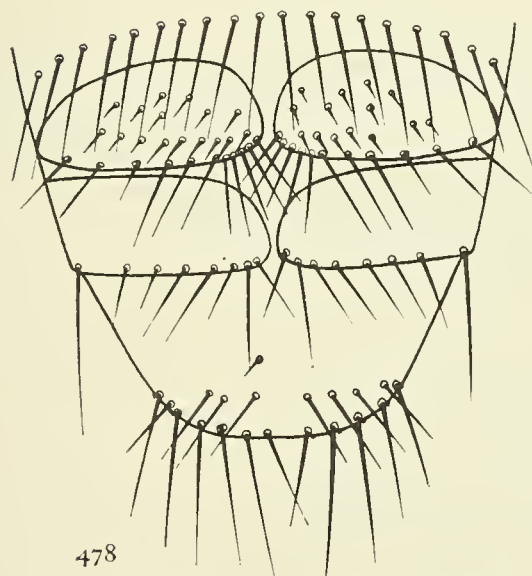
*Basilia dubia*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.The female of this species is very closely related to *B. carteri* from which it differs in the small number of minute spines on the pleurae which form a small group of about 15 spines on a bare area, while in *B. carteri* the whole pleurae are covered with spines. The anal segment of *B. dubia* is densely covered with setae laterally, which are less numerous and present only in the posterior part of the segment in *B. carteri*.The male differs from *B. carteri* in having more numerous short setae on the surface of tergite 2. The spines on sternite 5 are longer. They are 40 in number in the male specimen



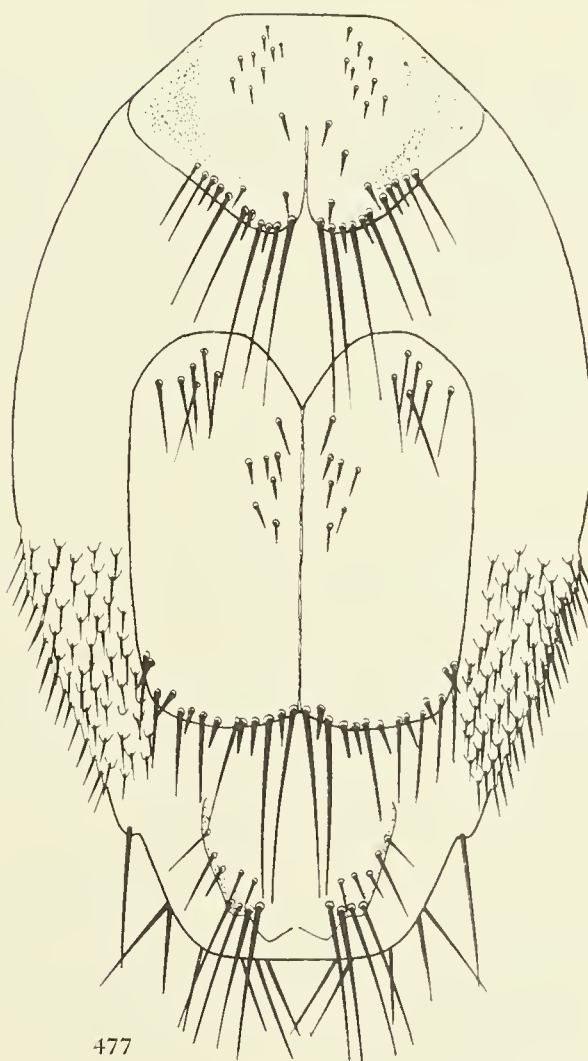
475



476



478



477

Figs. 475-478. *Basilia* spp. *B. currani* Guimarães. Female. 475. abdomen, dorsal; 476. same, ventral, posterior part; *B. juquiensis juquiensis* Guimarães. Female. 477. abdomen, dorsal; 478. same, ventral, posterior part.

examined and not 24 as given in the description. The aedeagus resembles that of *B. carteri*, but is more strongly curved dorsally, and the ventral process is more rounded.

*B. dubia* may eventually prove a subspecies of *B. carteri*, when more material becomes available.

Distribution and hosts: Brazil, Peru, from *Myotis nigricans* and *Myotis albescens*.

## MATERIAL IN THE COLLECTION

## PERU

Rio Ucayali, 28.xi. 1923, L. Rutter, no. 430, 1 ♂.

***Basilia dunni* Curran, 1935**

*Basilia dunni*. Curran, 1935, *Amer. Mus. Nov.* **765**, 1.

*Basilia dunni* Curran. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

This species has been described from a single female from Panama, from *Myotis nigricans*. It resembles *B. carteri* closely and both species will probably prove identical.

***Basilia ferrisi* Schuurmans Stekhoven, 1931**

*Basilia ferrisi*. Schuurmans Stekhoven, 1931, *Zeitschr. Parasitenk.* **3**, 205.

*Basilia speiseri* Miranda Ribeiro. Ferris, 1924, *Ent. News*, **35**, 191.

*Basilia ferrisi*. Scott, 1936, *Jour. Linn. Soc. Zool.* **39**, 479.

*Basilia ferrisi* Schuurmans Stekhoven. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

According to Guimarães & d'Andretta, 1956, this species is indistinguishable from *B. myotis*.

## MATERIAL IN THE COLLECTION

## COSTA RICA

Sipurio, from *Myotis nigricans*, 1 ♂ 1 ♀ paratypes. U.S. National Museum 62253.320 (Brit. Mus. 1936.99).

***Basilia guimaraesi* (Schuurmans Stekhoven, 1951)**

*Guimaraesia guimaraesi*. Schuurmans Stekhoven, 1951, *Acta Zool. Lilloana*, **12**, 101.

*Basilia guimaraesi* (Schuurmans Stekhoven). Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

This species is closely related to *B. currani*, from which it differs, according to Guimarães & d'Andretta, by the greater number of setae on the anal segment and by the form of the sclerites of sternite 6 which are more parallel-sided, not as markedly triangular as *B. currani*.

Distribution and host: São Paulo, Brazil, from *Myotis nigricans*.

***Basilia hughscotti* Guimarães, 1946**

*Basilia hughscotti*. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.

*Basilia hughscotti*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

Head with about 15 setae on the vertex and the anterior dorsal margin. Thorax very wide, width to length = 3 : 2. 12 notopleural setae. Tibiae with strongly curved apical end and 4 rows of setae.

*Female abdomen*. Tergite 1 with 2 large rounded lobes, each with a marginal row of about



20 long setae and with short setae on the surface. Tergal plate 2 with rounded posterior margin with an indentation in the middle and a marginal row of long setae. Surface bare except for a few short setae in the anterior lateral corners. Anal segment broadly conical, with long setae posteriorly and short setae on the dorsal surface laterally. Sternite 1 + 2 with a ctenidium of about 35 short spines which are more widely spaced than in other species. Sternite 5 with narrow lateral sclerites. Sternite 6 with larger, nearly rectangular sclerites. Sternite 7 undivided, about as long as sternite 6. Genital plate with about 12 setae of varying length.

Male unknown.

Distribution and hosts: Brazil, Rio Grande do Sul, from *Chrotopterus auritus australis*.

Known only from the holotype.

***Basilias juquiensis juquiensis* Guimarães, 1946**

(Figs. 477, 478)

*Basilias juquiensis*. Guimarães, 1946, *Arq. Zool. São Paulo*, 5, 1.

*Basilias juquiensis* Guimarães. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1

Head with 4 setae at the anterior dorsal margin. 6–8 notopleural setae.

*Female abdomen*. Tergite 1 with an incision in the middle of the posterior margin which bears 3 long and several short setae in each half. Tergal plate 2 narrow, consisting of lateral plates which are about twice as long as wide, with a row of long setae and spines at the rounded posterior margin. Surface bare, except for a group of short setae in the anterior lateral corners and a few shorter setae near the midline anteriorly. Pleurae covered with short setae. Anal segment slightly conical. Sternite 1 + 2 very long, covering about half the abdomen, with a ctenidium of 55 spines. Sternites 3 and 4 not separable. Sternites 5 and 6 with parallel-sided transverse lateral sclerites of about equal size. Sclerites of sternite 5 with short setae on the surface, those of sternite 6 bare. Sternite 7 rounded posteriorly. Genital plate with 6 thin setae.

Male unknown.

Distribution and hosts: Brazil, São Paulo, from *Myotis nigricans*.

Known only from the holotype.

***Basilias juquiensis anceps* Guimarães & d'Andretta, 1956**

*Basilias anceps*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Differs from *B. j. juquiensis* in having pleurae with short setae anteriorly and short spines posteriorly. Male unknown.

Distribution and host: Colombia, Peru, from *Myotis nigricans*.

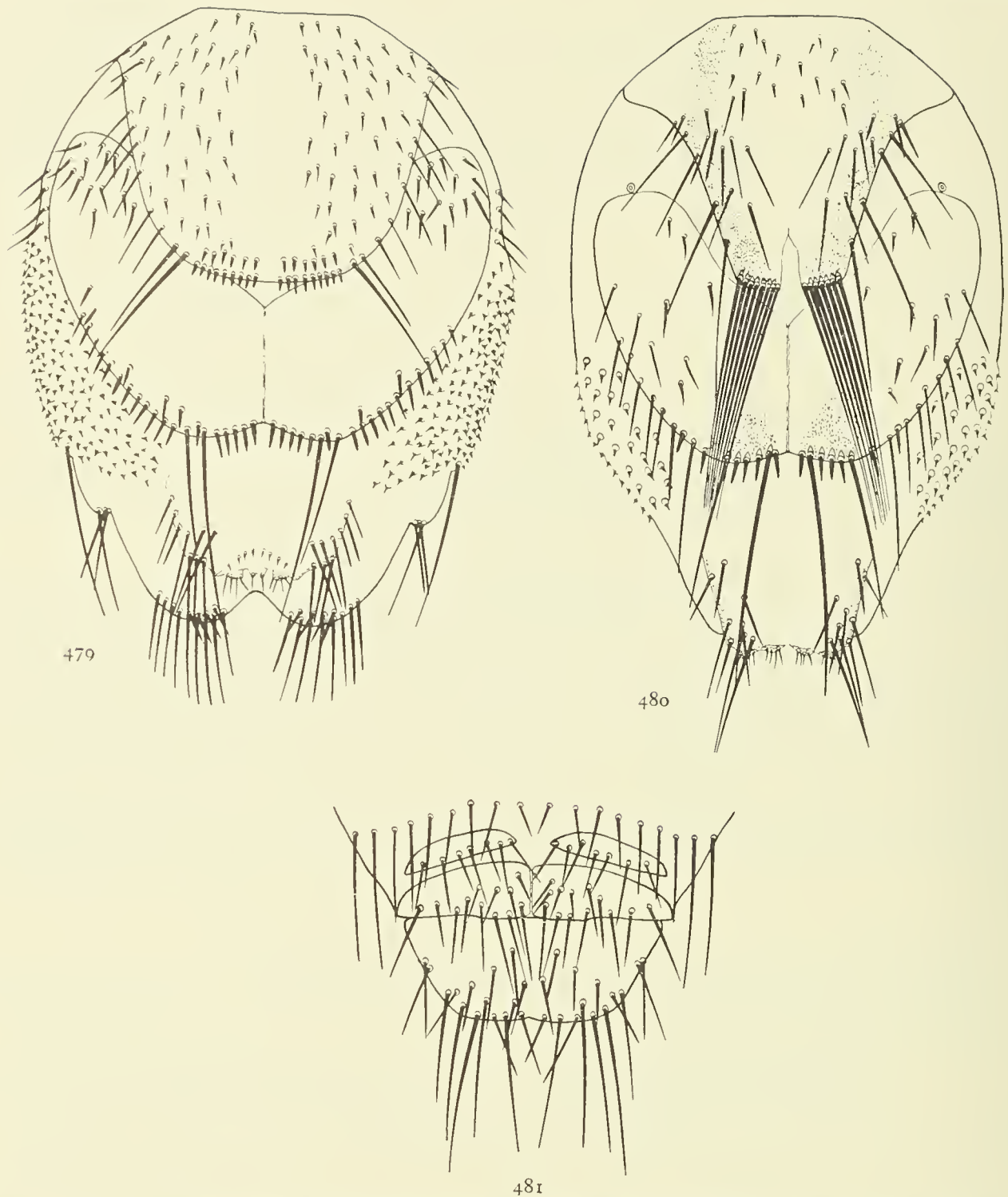
***Basilias mirandaribeiroi* Guimarães, 1942**

(Fig. 479)

*Basilias mirandaribeiroi*. Guimarães, 1942, *Pap. Avuls. Dept. Zool.* 2, 146.

*Basilias mirandaribeiroi* Guimarães. Guimarães, 1946, *Arq. Zool. São Paulo*, 5, 1.

*Basilias mirandaribeiroi* Guimarães. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1



Figs. 479-481. *Basilia* spp. *B. mirandaribeiroi* Guimarães. Female. 479. abdomen, dorsal; *B. myotis* Curran. Female. 480. abdomen, dorsal; 481. same, ventral, posterior part.

Head with 4 setae at the anterior dorsal margin and 4 between the eyes. 10-12 notopleural setae.

*Female abdomen.* Tergite 1 broadly rounded posteriorly, with a double row of spines in the middle of the posterior margin and setae laterally. Tergal plate 2 broadly rounded with a small median indentation of the posterior margin. 2 long setae in the middle of the posterior margin

in each half, only spines otherwise. Surface bare except for a few short setae in the anterior lateral corners and near the posterior margin. Anal segment slightly conical, with setae posteriorly, otherwise bare. Pleurae covered with minute spines. Sternite 1 + 2 with a ctenidium of about 70 spines. Sternites 5 and 6 with parallel-sided lateral sclerites of about equal size, those of sternite 5 tapering towards the middle, those of sternite 6 rectangular. Sternite 7 trapezoidal, with a median indentation of the posterior margin. Genital plate with 7–8 long setae. Anal sclerite large, with 2 setae.

Male unknown.

Distribution and hosts: Brazil, São Paulo, from *Myotis nigricans* and *Eptesicus brasiliensis*.

### ***Basilias myotis* Curran, 1935**

(Figs. 422, 441, 480, 481)

*Basilias myotis*. Curran, 1935, *Amer. Mus. Nov.* **765**, 1.

*Basilias bellardii* Rondani. Schuurmans Stekhoven, 1931, *Zeitschr. Parasitenk.* **3**, 205.

*Basilias bellardii* Rondani. Hase, 1931, *Zeitschr. Parasitenk.* **3**, 220.

*Basilias bellardii* Rondani. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.

*Basilias bellardii* Rondani. Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117.

*Guimaraesia bellardii* Rondani. Schuurmans Stekhoven, 1951, *Acta Zool. Lilloana*, **12**, 101.

*Basilias myotis* Curran. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

*Basilias myotis* Curran. Peterson, 1960, *Proc. Ent. Soc. Ontario*, **90**, 30.

Head and thorax as in *B. speiseri*.

*Female abdomen*. Tergite 1 truncate triangular, long, with 2 groups of 7–10 very long and strong setae (rarely 5 or 6). Tergal plate 2 broad, rounded posteriorly, consisting of lateral obliquely placed sclerites as in *B. speiseri*. 3–4 long setae at the posterior margin of tergal plate 2 which are longer than in *B. speiseri*. Pleurae covered with minute spines and only 3–4 setae posteriorly, while *B. speiseri* has a group of about 8–15 longer setae posteriorly on the pleurae. Sternite 5 with small, narrowly elliptical lateral sclerites, which are placed obliquely. Sternite 6 with larger truncate triangular sclerites. Sternite 7 rectangular, with rounded posterior corners. Genital plate with 6–8 setae as in *B. speiseri*, but the sclerotized strip towards the anus ends in a sharp point and there is no anal sclerite in the specimens examined. Adanal plates rounded posteriorly, with 5–6 short setae.

Male indistinguishable from that of *B. speiseri*.

*B. myotis* is probably identical with *B. ferrisi*. It is very closely related to *B. speiseri*, from which it differs mainly in the greater number of setae on tergite 1 and in other minor details of chaetotaxy, as well as in the shape of the lateral sclerites of sternite 6. There are specimens of *B. speiseri* in which the anal sclerite is absent and in which the number of setae on the pleurae is reduced. Individual specimens may thus be indistinguishable. *B. myotis* may eventually have to be considered as a subspecies of *B. speiseri*.

Distribution and hosts: Panama, Guatemala, Colombia, Venezuela, British Guiana, from *Myotis nigricans*, rarely from other bats.

### MATERIAL IN THE COLLECTION

#### COLOMBIA

Villavicencio, from *Myotis nigricans*, 19.xii. 1939, Frei Niceforo Maria, 1 ♂ 1 ♀.



**Basilia peruvia** Guimarães & d'Andretta, 1956

(Fig. 424)

*Basilia peruvia*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

Head with 6 setae at the anterior dorsal margin and 2 between the eyes. 8 notopleural setae.

*Male abdomen*. Tergites with single marginal rows. Tergite 2 with a double row of setae on the surface, tergites 3–6 bare. Sternite 5 with an incision of the posterior margin and a group of 18–20 spines in 2 rows, those of the posterior row longer.

*Genitalia*. Aedeagus short, wide, spatulate, with serrations dorsally and ventrally. Parameres triangular.

*Female abdomen*. Tergite 1 long, triangular, with concave sides, with 2 groups of 2–3 setae at the apex. Tergal plate 2 consisting of 2 elliptical sclerites, touching in the middle for a short distance as in *B. constricta*. Both plates form a rounded posterior margin which bears 6–8 long setae near the midline and shorter setae and spines laterally. Surface with short setae in the anterior lateral part. Pleurae with short spines and a row of short setae posteriorly. Anal segment slightly conical, nearly parallel-sided. Sternite 1 + 2 very long, with a ctenidium of 55 spines. Sternite 4 with a posterior row of short spines. Sternite 5 with lateral narrowly elliptical sclerites which are less wide than those of sternite 6 which are similar in form. Genital plate with 5–6 setae connected by a sclerotized strip with the anal sclerite which bears 2–3 setae. Adanal plates triangular, with 4–6 setae posteriorly.

Distribution and hosts: Peru, from *Myotis nigricans* and *Tadarida*.

## MATERIAL IN THE COLLECTION

## PERU

Masisea, River Ucayali, 26.viii. 1923, L. Rutter, 1 ♂ (no. 138).

**Basilia speiseri** (Miranda Ribeiro, 1907)

(Figs. 427, 440, 482, 483)

*Pseudelytromyia speiseri*. Miranda Ribeiro, 1907, *Arch. Mus. Nac. Rio de Janeiro*, **14**, 231.

*Basilia speiseri* Miranda Ribeiro. Guimarães, 1946, *Arq. Zool. São Paulo*, **5**, 1.

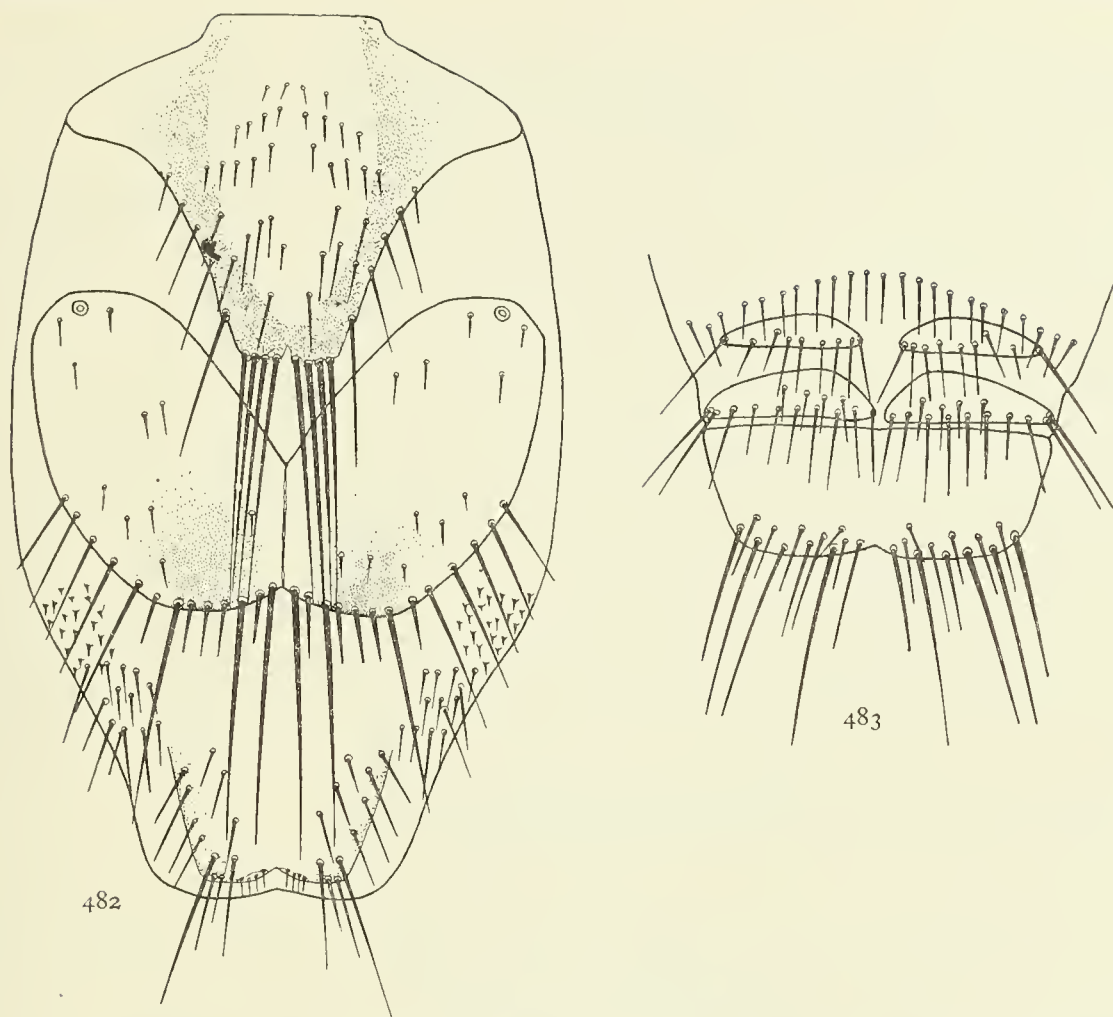
*Basilia speiseri* Miranda Ribeiro. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, **9**, 1.

Head with 4 setae at the anterior dorsal margin and 2 between the eyes. 8–10 notopleural setae.

*Male abdomen*. Tergites with single marginal rows, all bare on the surface except for a few hairs on the sides of tergite 2. Sternite 5 with a group of about 25 spines in 2 rows. Those of the posterior row are longer and there is a gap in the middle of the row.

*Genitalia*. Aedeagus wide and short, widening apically, with serrations dorsally and ventrally. Parameres with pointed end.

*Female abdomen*. Tergite 1 triangular, long, with concave sides and 2 groups of 4–6 long setae posteriorly. Tergal plate 2 consisting of 2 obliquely standing, roughly elliptical plates, forming a rounded posterior margin. 3–4 long setae near the middle of the posterior margin, alternating with spines and shorter setae and spines laterally. Surface with short setae mainly anteriorly and laterally. Pleurae with short spines and a group of 8–15 setae posteriorly. Anal



Figs. 482, 483. *Basiliaspeiseri* (Miranda Ribeiro). Female. 482. abdomen, dorsal; 483. same, ventral, posterior part.

segment slightly conical, with long setae posteriorly and short setae laterally. Sternite 5 with narrowly elliptical lateral sclerites. Sternite 6 with similar but larger sclerites. Sternite 7 rectangular, with rounded posterior corners, as long as sternites 5 and 6 together. Genital plate with 6–8 setae in 2 rows, connected with the anal sclerite by a sclerotized strip. Anal sclerite with 2 setae. Adanal plates large, triangular, with 5–6 setae posteriorly.

Distribution and hosts: Argentine, Brazil, Paraguay, from *Myotis nigricans*, *Lasiurus borealis bonariensis*, *Eptesicus brasiliensis* and more rarely from several other species.

#### MATERIAL IN THE COLLECTION

##### ARGENTINE

Humboldt near Santa Fé, from *Phyllostoma* sp.,  
vii. 1918, Ehrhardt, N. C. Rothschild, 2 ♂ 4 ♀  
(Brit. Mus. 1921.200).

##### PARAGUAY

Sapucay, from *Eptesicus brasiliensis*, 29.xii. 1901,  
W. Foster, N. C. Rothschild, 1 ♂ 3 ♀.  
Pilar, Tacuaras, from *Myotis albescens*, 12.xi. 1900,  
W. Foster, N. C. Rothschild, 1 ♀.

##### BRAZIL

The Museum in Rio de Janeiro, no further data, 1 ♀.  
From *Molossus obscurus*, 2 ♀.

#### HOST SYNONYMY

Name on original label  
*Histiotes dorianus* Dobson or  
*Vespertilio dorianus* Dobson.

Current name  
*Eptesicus brasiliensis* Desmarest.

**Basilia travassosi** Guimarães, 1938

*Basilia travassosi*. Guimarães, 1938, *Livro Jubil. Travassos*, 183.

*Basilia travassosi* Guimarães. Guimarães, 1938, *Arq. Zool. São Paulo*, 5, 1.

*Basilia travassosi* Guimarães. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Head with 2 setae at the anterior dorsal margin and 2 between the eyes. 8 notopleural setae.

*Male abdomen*. Tergites 2–6 with single marginal rows, bare on the surface. Sternite 5 with a group of about 20 spines in 2 rows. The posterior row is longer and has a gap in the middle.

*Genitalia*. Aedeagus short, wide, spatulate, without serrations. Parameres with triangular apical end.

*Female abdomen*. Tergite 1 short, incompletely divided in the middle, with concave sides and a marginal row of short setae posteriorly and laterally. Tergal plate 2 very wide, extending to the pleurae, with straight posterior margin which bears a row of long and short setae. The tergal plate is incompletely divided in the middle and has a row of short setae on the surface along the anterior margin. Anal segment slightly conical, with longer setae posteriorly and shorter setae laterally. Sternite 1 + 2 with a ctenidium of 55 spines. Sternite 4 with a posterior row of short spines. Sternite 5 with elliptical lateral sclerites which are placed transversely. Sternite 6 with similar but larger and wider sclerites. Sternite 7 rectangular, with rounded posterior corners, as long as sternites 5 and 6 together. Genital plate with 4 thin setae, connected by a sclerotized strip with the anal sclerite which bears 2 setae.

Distribution and host: north-east Brazil, from *Myotis albescens*.

*Insufficiently known species***Basilia flava** Weyenbergh, 1881

*Basilia flava*. Weyenbergh, 1881, *Ann. Soc. Cient. Argentine*, 11, 193.

*Basilia flava* Weyenbergh. Guimarães, 1946, *Arq. Zool. São Paulo*, 5, 1.

*Basilia flava* Weyenbergh. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Closely resembling *B. plaumanni* according to Guimarães, 1946. Only the male is known. The genitalia have not been described.

Distribution and host: Argentine, from a species of *Histiopus*.

**Basilia rugosa** Schuurmans Stekhoven, 1942

*Basilia rugosa*. Schuurmans Stekhoven, 1942, *Beitr. Fauna Peru*, 3, 96.

*Basilia rugosa* Schuurmans Stekhoven. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Insufficiently described. According to Guimarães & d'Andretta, 1956, perhaps the male of *B. dubia*.

Distribution: Peru. Male only, no host.

SUBGENUS **CONOTIBIA** n. subgen.

Type species: *Basilia (Conotibia) compar* n.sp.

Eyes with 2 lenses. Tibia 2 different in shape from tibia 1 and 3, conical, with 2–3 rows or



short spines near the base. Femur 2 curved, with a rounded extension of the anterior surface at the apical end. Basitarsi very short. Abdomen of the female with 4 tergal plates before the anal segment. Anal segment narrow, parallel-sided. Genital plate of *Basilis* type. *Male genitalia*: Phallobase cylindrical, with a dorsal protuberance. Aedeagus cylindrical. Parameres large, triangular, movable.

This diagnosis is based on the species *compar* and may have to be modified when further species of this subgenus become known.

Speiser (1901) described *Nycteribia* (*Acrocholidia*) *dispar* from a male and 3 females from New Guinea. Both sexes, as described by Speiser, clearly do not belong to the same species. Speiser called attention to the peculiar structure of leg 2 in the male, which, however, was of normal structure in the females, hence the name *dispar*. A male and a female of a similar species from the collection of the Vienna Natural History Museum were labelled *Cryptocoeleps compar* by Speiser, but apparently not published. In this case both male and female have the same peculiar structure of leg 2. The same structure of leg 2 was found again in material from Malaya and Burma and Speiser's name *compar* is used although his specimens are unfortunately without data and in a bad state of preservation and it is thus not certain that they belong to the same species.

***Basilis* (*Conotibia*) *compar* n.sp.**

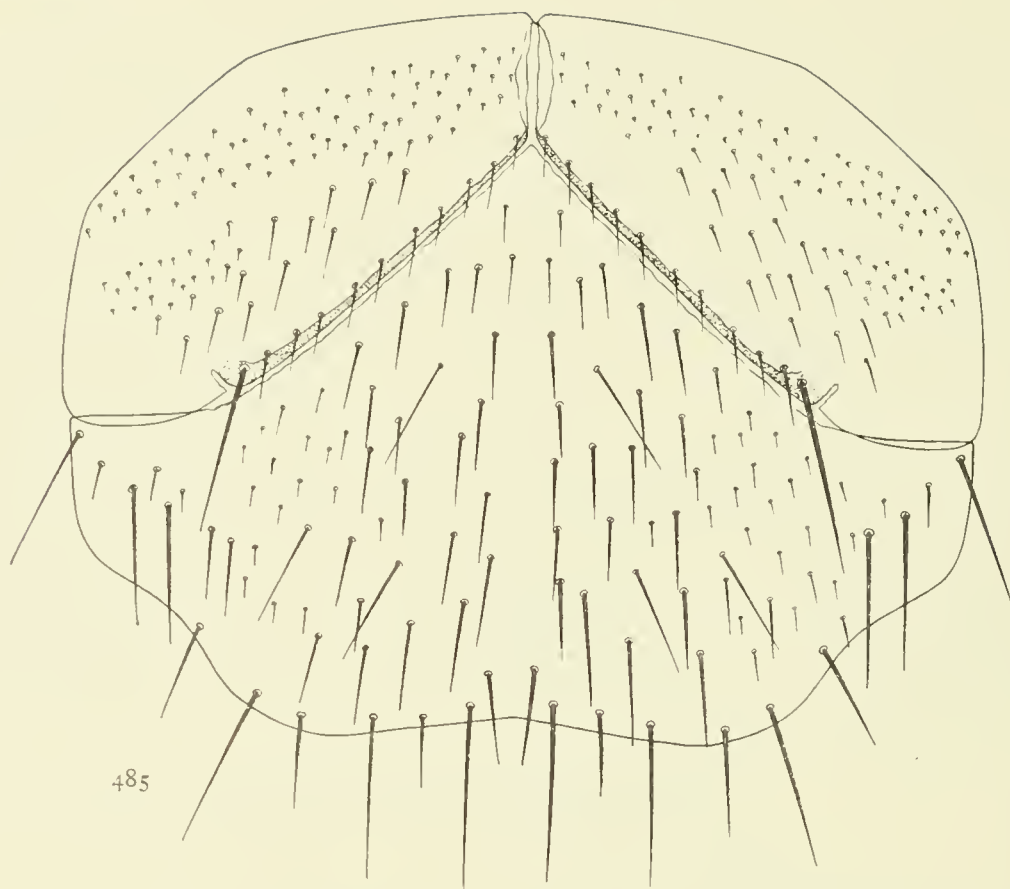
(Figs. 484-492)

Length 1.75-2.2 mm. Colour light brown.

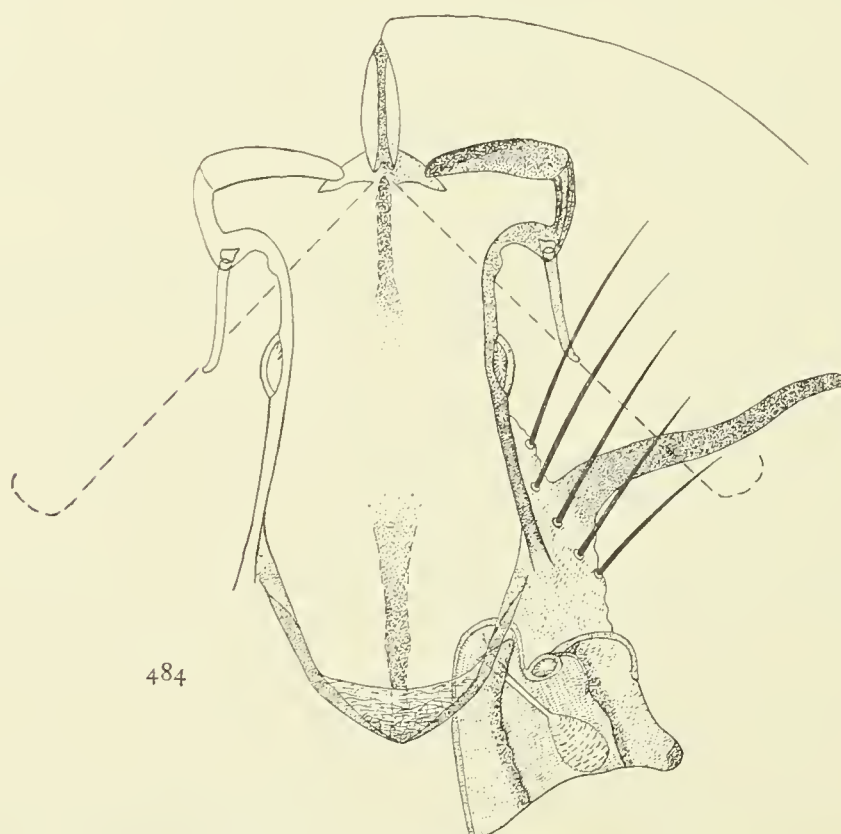
*Head*. Long, sclerotized to the anterior dorsal margin, laterally compressed, with 4-6 setae at the anterior dorsal margin. Eyes unpigmented and therefore apparently overlooked by Speiser. 1 or 3 lenses in some specimens. A long and several short setae at the ventral part of the anterior margin. Palpi very slender, flattened dorso ventrally, with a long terminal seta and several shorter setae further basally. Labella of the proboscis very short, half the length of the theca.

*Thorax*. Rounded anteriorly, wider than long. Length to width = 2:3. Median ventral suture indistinct in the middle. Angle of the oblique sutures 90°. Sternal plate covered with shorter and longer setae. The longer setae along the oblique sutures are longest laterally. Some longer setae also in the posterior half of the sternal plate and at the posterior margin. Mesonotum moderately wide, lateral plates of the notopleural sutures narrow, reaching anteriorly only to the base of the mesopleural suture. Only 3-5 notopleural setae. Haltere groove open. Femur 2 curved, with a rounded extension at the apical end of the anterior surface, covering the base of the tibia. Femur 1 and 3 normal. Tibiae 1 and 3 with curved ventral edge with 3 rows of long setae in the distal half. Fore tibia 5 times, mid tibia 5.5-6 times as long as wide. Basitarsi 1 and 3 about half as long as the tibiae. Tibia 2 conical, tapering towards the tip, with straight ventral and curved dorsal side, as long as tibia 3, with 3 rows of spines near the base at the ventral side. Basitarsus 2 very short, about a quarter of the length of the tibia. This form of leg 2 is unique among Old World species and a similar tibia occurs only in the American genus *Herskovitzia*. Thoracic ctenidium with 15 long, pointed spines.

*Male abdomen*. Post-spiracular sclerite wider near the spiracle, with 4 long setae. Tergite 1



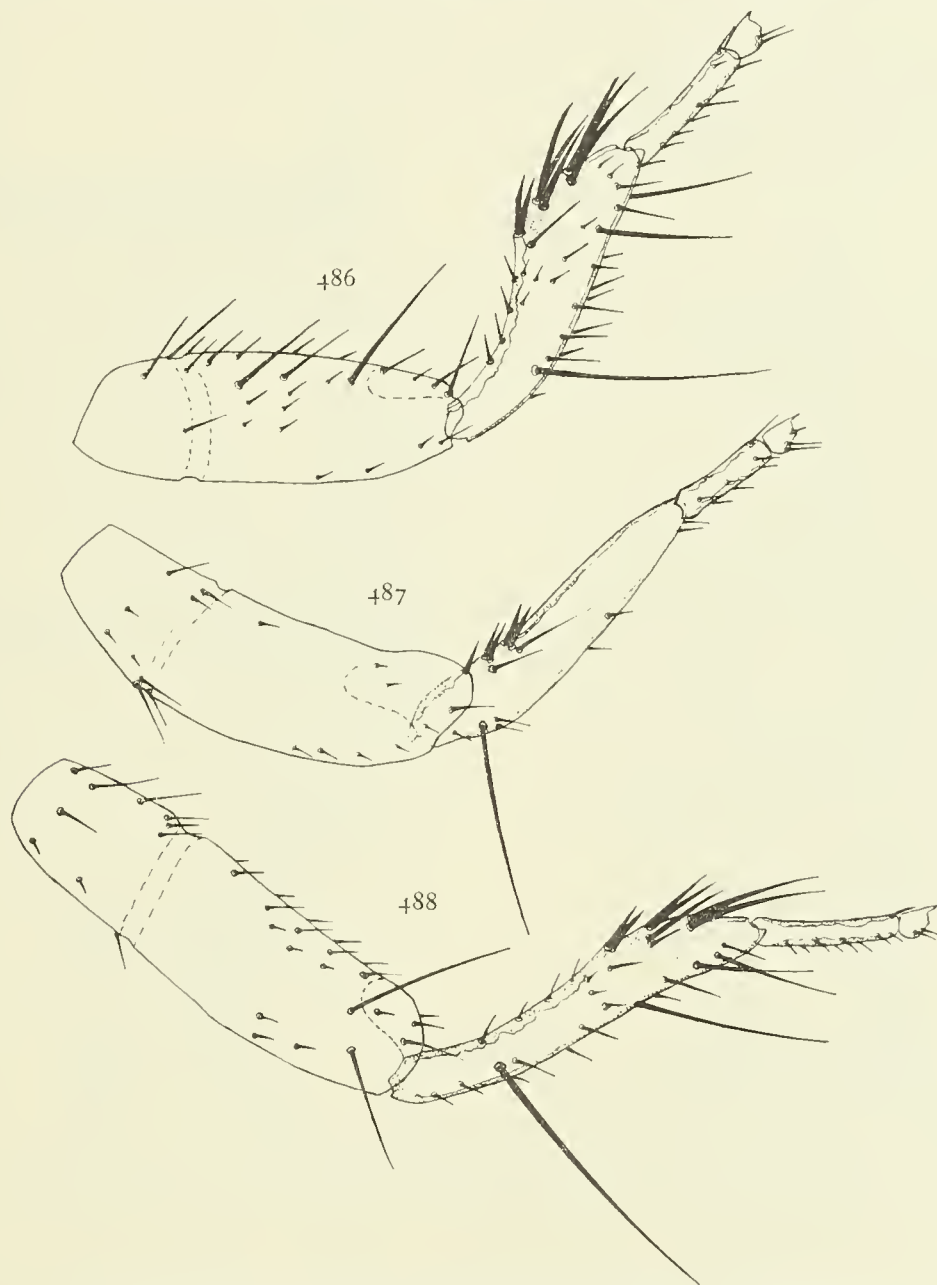
485



484

Figs. 484, 485. *Basilia (Conotibia) compar* n.sp. 484. dorsal pattern of thorax; 485. sternal plate of thorax.

with concave posterior margin, with a row of short setae. Tergites 2-5 with uniform marginal rows of equally spaced setae. A gap in the marginal row of tergite 6 and 2 long setae near the middle of the row. Surface of all tergites bare. Anal segment short, cylindrical, with longer setae posteriorly and a transverse row of short setae on the dorsal surface. Sternite 1 + 2 short, semi-circular, with a ctenidium of 36 long spines and 2 rows of short setae on the surface.

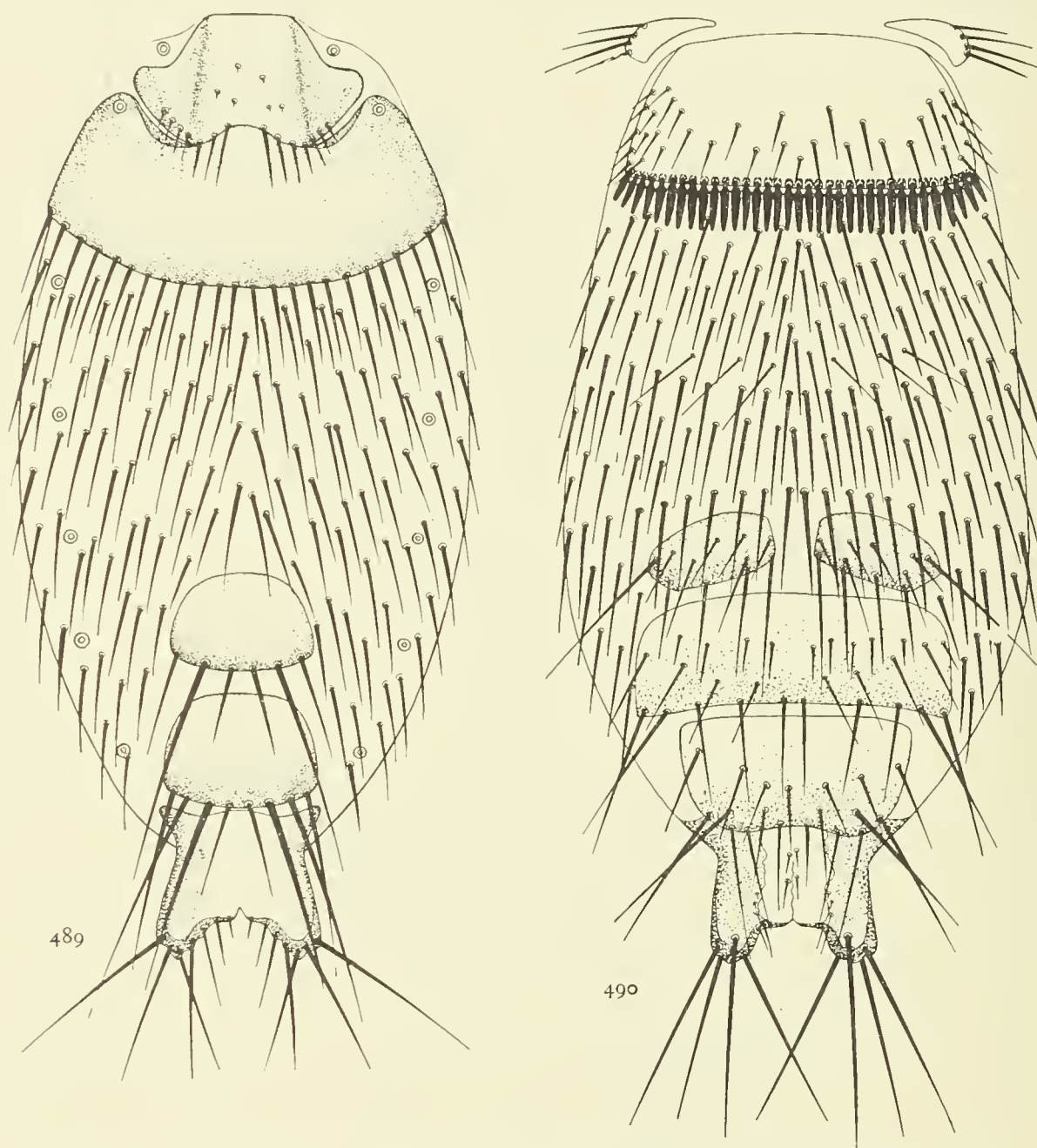


Figs. 486-488. *Basilias (Conotibia) compar* n.sp. legs 1-3 respectively.

Sternites 3 and 4 with marginal rows of longer and shorter setae and 1-2 rows of short setae on the surface. Sternite 5 not longer than 4, with rounded posterior corners and a group of about 15 short, thick spines in a double row at the posterior margin. Longer and shorter setae laterally to the group of spines and a premarginal row of long setae. 3-4 long, thick setae at the sides of the anal segment near the base of the ventral side.



*Genitalia.* Claspers straight, slender, slightly curved, with dark ends. A long seta dorsally near the base and a few shorter setae further apically. Basal arc rounded triangular. Aedeagus long, cylindrical, slightly curved, membranous near the tip. The ventral margin of the aedeagus bears small spines. Apodeme long and thin, practically without end-plate. Phallobase with a

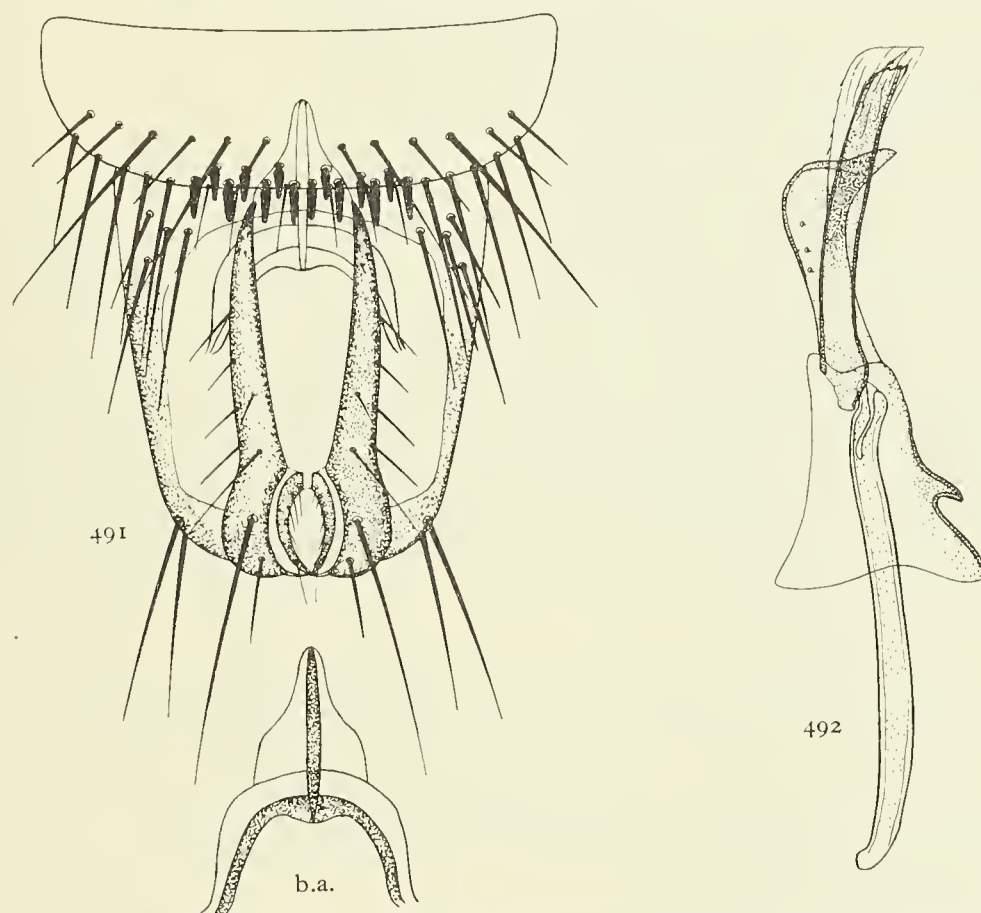


Figs. 489, 490. *Basilia (Conotibia) compar* n.sp. Female abdomen. 489. dorsal; 490. ventral.

dorsal protuberance with 1-2 minute hairs at the tip. Parameres long, with a pointed apical end and a strongly rounded ventral edge. They can be folded back entirely.

*Female abdomen.* Tergite 1 as in the male. Tergal plate 2 short, rounded, undivided, with a uniform row of setae at the posterior margin. Surface bare. Tergal plates 3 and 4 elliptical or rectangular, with about 6 long setae and a few spines at the posterior margin. Surface bare.

Connexivum between tergal plates 2 and 3 covered with moderately long, thick setae and a row of longer setae lateral to tergal plate 3. Anal segment short, narrow, slightly widening posteriorly, with 4 long setae at the posterior processes. Sternite 1 + 2 as in the male. Sternites 3 and 4 with uniform marginal rows of long setae. 4-5 rows of setae on the surface of sternite 3 and only one row on sternite 4. Sternite 5 with lateral elliptical sclerites which do not reach the midline and 1-2 setae between them. 4 long horizontal and 1 vertical seta laterally at the posterior margin. Several short setae on the surface. Sternite 6 undivided, with 2 long, vertical setae laterally and 5-6 horizontal setae at the posterior margin. 1-2 rows of short, vertical setae



Figs. 491, 492. *Basilia (Conotibia) compar* n.sp. Male. 491. sternite 5 and genital area, with basal arc; 492. genitalia.

on the surface. Sternite 7 trapezoidal, with 2 long premarginal vertical setae laterally and shorter setae at the posterior margin. Anal frame widely open ventrally. Two pairs of closely placed setae represent the anal sclerite. Genital plate represented by 2 setae on an area of minute spines.

The species described shows a number of unusual characters. The structure of the legs and of the male genitalia is exceptional among Old World species. A similar structure of leg 2 and a similar protuberance of the phallobase are found only in some American species. Although the species has the general characters of the genus *Basilia*, the characters mentioned above justify the creation of a new subgenus.

MALAYA. Selangor, Ulu Langat, 28.iv. 1950, R. Traub, ♂ holotype, 2 ♂ 3 ♀ paratypes, RTB-6630. Chicago Natural History Museum.

Pahang Road near Kuala Lumpur, 3.ix. 1948, R. Traub & B. Insoll, 1 ♂, RTB-8384; 2.xii. 1948, 1 ♀, RTB-2212, paratypes.

Bukit Lagong Forest Reserve, from *Kerivoula hardwickei*, 22.ii. 1950, R. Traub, 1 ♀, RTB-9336.

Bukit Lagong Forest Reserve, from *Myotis mystacinus muricola*, 22.ii. 1950, R. Traub, 1 ♀, RTB-9337.

INDOCHINA. Annam, Bau Me Thuot, from *Kerivoula* sp., March 1937, W. H. Osgood, 1 ♀.

## MATERIAL IN THE COLLECTION

## MALAYA

Selangor, from bat no. 62.22, 28.ii. 1962, Lord Cranbrook, 1 ♂ paratype.

Pahang, Selangor, 28.xii. 1948, R. Traub, 1 ♀ paratype.

SUBGENUS **PARACYCLOPODIA** Scott, 1917

*Paracyclopodia*. Scott, 1917, *Parasitology*, **9**, 593. Type species: *Cyclopodia* (*Paracyclopodia*) *roylii* (Westwood).

Head, eyes, abdomen of the male and male genitalia as in the subgenus *Basilina*. Tibiae tapering gradually towards the apical end, with setae in the middle of the ventral edge. The abdomen of the female has a very long tergal plate 1 and sternite 1 + 2. All other segments and spiracles 2-7 are concentrated in the posterior half or third of the abdomen and the segments are strongly modified in shape. Sternite 7 is placed vertically to the ventral surface and functions as genital plate.

***Basilina* (*Paracyclopodia*) *bouvieri*** (Falcoz, 1924)

(Figs. 493-498)

*Tripselia* (*Neotripselia*) *bouvieri*. Falcoz, 1924, *Bull. Mus. Hist. Nat. Paris*, **30**, 223.

*Basilina* (*Paracyclopodia*) *bouvieri* (Falcoz). Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.2-2.5 mm. Colour brown.

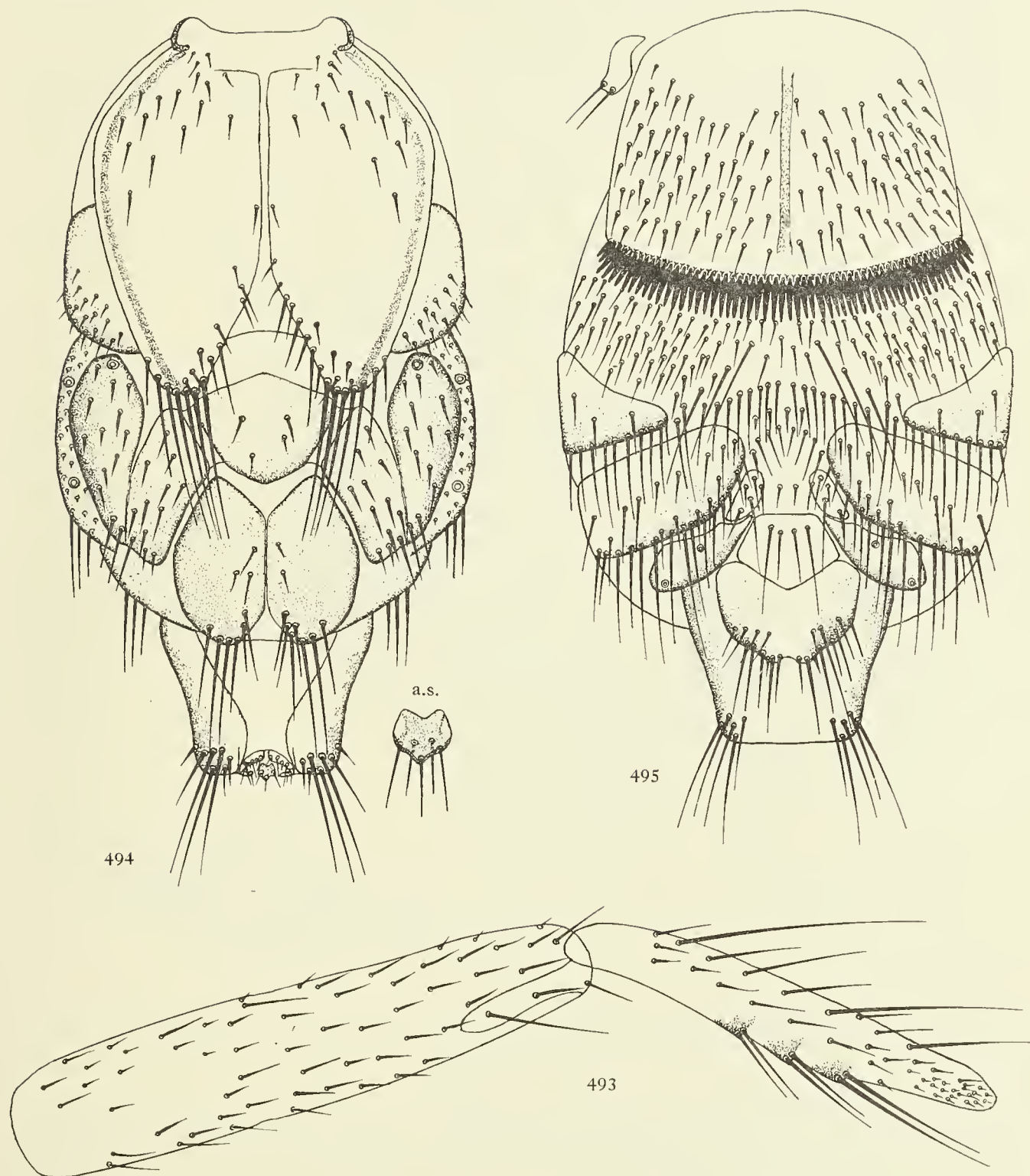
*Head*. Long, laterally compressed, with 6 setae at the anterior dorsal margin and 2 setae between the eyes. Labella of the proboscis slightly shorter than the theca.

*Thorax*. Slightly wider than long. Sternal plate nearly square. Angle of oblique sutures about 95°. 9-12 notopleural setae. Tibiae slender, 5 times as long as wide, tapering from the middle with 3 rows of setae in the middle of the ventral edge.

*Male abdomen*. Tergite 1 with 2 rounded posterior lobes and a marginal row of short setae. Tergite 2 with a marginal row of short setae and short spines. A few short hairs at the sides of the surface. Tergite 3 with a marginal row of longer setae. Tergites 4-6 with marginal rows of long setae, shorter setae and spines. Surface bare. Anal segment short, conical, with long setae posteriorly, bare on the dorsal surface. Sternite 1 + 2 with a ctenidium of 50 spines. Sternite 5 short, with a double row of short spines at the posterior margin, about 6 spines in the anterior and 9 spines in the posterior row, which are more widely spaced.

*Genitalia*. Claspers rather short, slightly curved, with a few long setae near the base. Basal

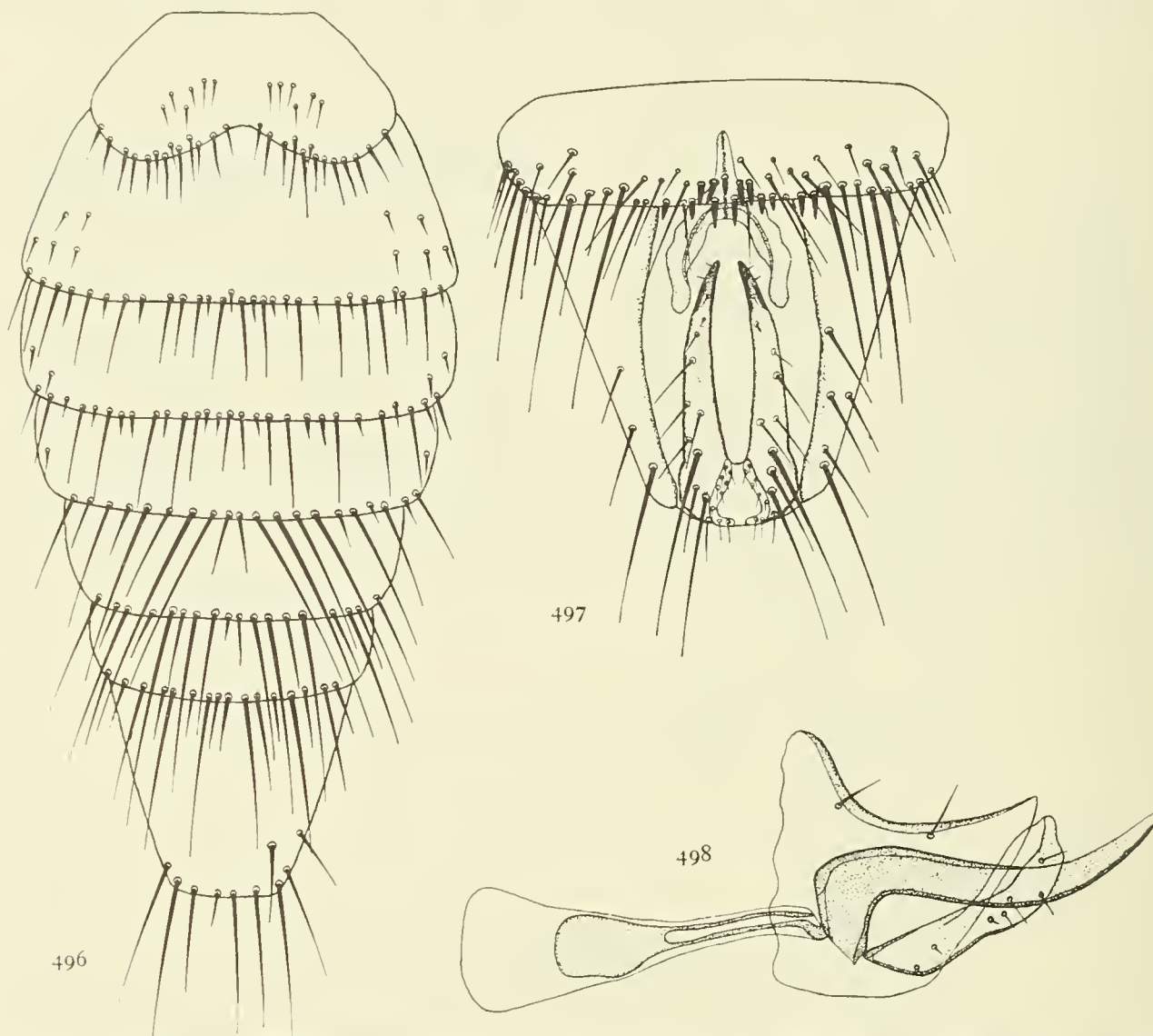




Figs. 493-495. *Basilia (Paracyclopodia) bouvieri* (Falcoz). 493. femur and tibia; 494. female abdomen, dorsal with anal sclerite; 495. same, ventral.

arc rounded, with long anterior process. Phallobase conical, with 2 setae near the base and 2 in the middle. Aedeagus slightly curved, of uniform width to about the middle and then tapering to a blunt point. Apodeme short, with a wide end-plate. Parameres narrow, strip-like, with blunt apical end.

*Female abdomen.* Tergal plate 1 long, with rounded sides, reaching to about the middle of the abdomen, divided by a median line, with two rounded processes which bear 4-5 long and

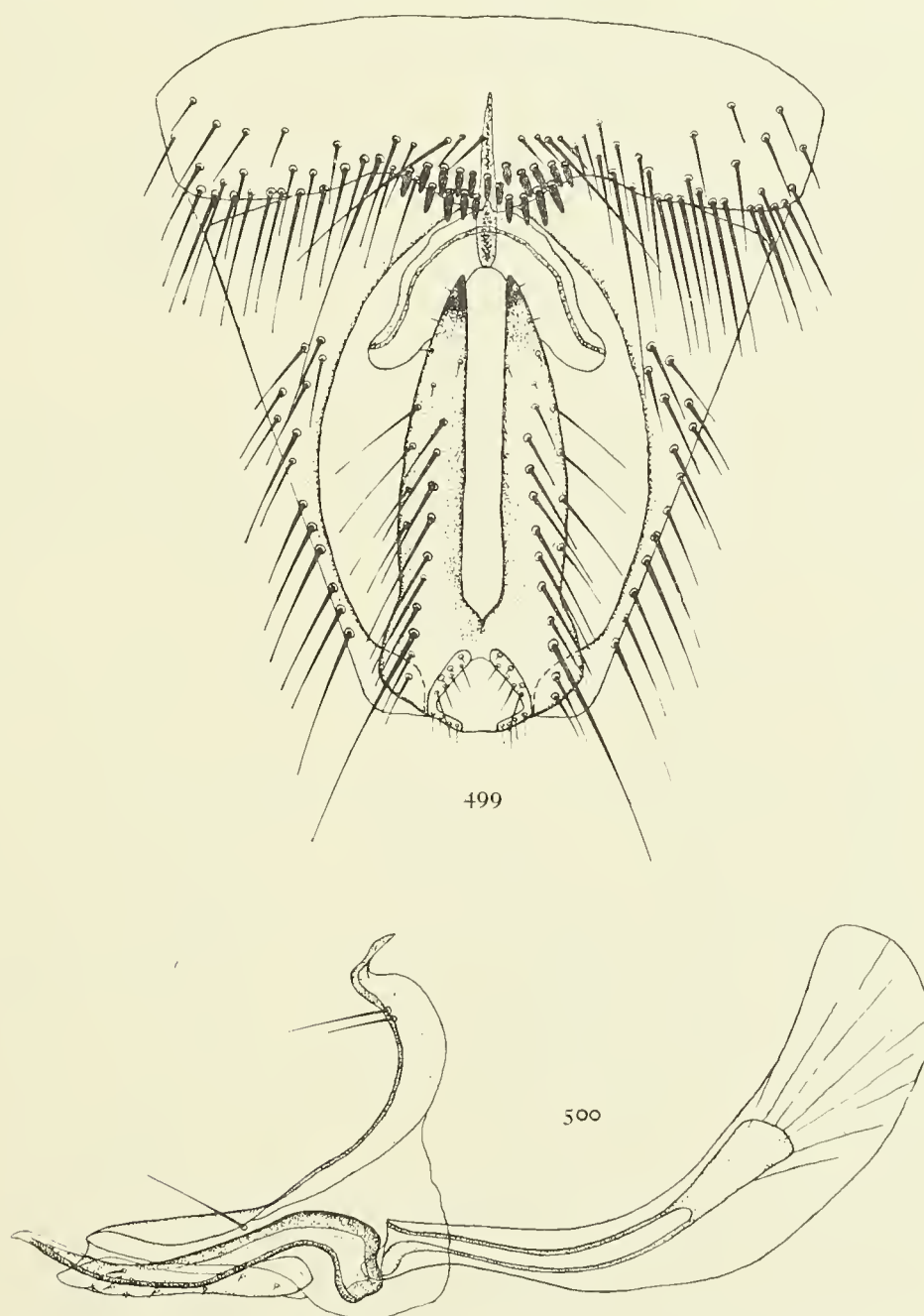


Figs. 496-498. *Basilia (Paracyclopodia) bouvieri* (Falcoz). Male. 496. abdomen, dorsal; 497. sternite 5 and genital area; 498. genitalia.

several shorter setae. These processes are widely separated. Short setae along the inner posterior margin of the tergal plate and a pigmented stripe along its outer margin. Short setae in the anterior part of the surface and near the posterior inner margin. Tergal plate 2 W-shaped. The outer arms of the W are triangular plates which are wider in front. Spiracle 2 is situated at the anterior margin of this plate, spiracle 3 a short distance laterally in the pleural membrane. Tergal plate 3 wedged into the posterior concavity of tergal plate 2. It consists of 2 triangular plates with several setae posteriorly. Anal segment short, conical, with short and long setae posteriorly,

bare on the surface. Sternite 1 + 2 rectangular, covering about half the abdomen, with a ctenidium of 55 spines which reach to the sides of the sclerite. Sternite 3 with triangular lateral sclerites. Sternite 4 similar, but the sclerites are larger, elliptical, placed obliquely and reach closer to the midline. Only 4-6 setae between the sclerites. Sternite 5 reduced to 2 small elliptical sclerites near the inner corners of the lateral sclerites of sternite 4. Sternite 6 consists of 2 obliquely placed, bare, elliptical sclerites. Spiracles 6 and 7 lie inside these plates. Sternite 7 rounded posteriorly, placed vertically to the ventral surface, with longer and shorter setae posteriorly. This sclerite functions as genital plate. Anal sclerite short and broad, with 3-5 short setae posteriorly.

Distribution and host: Ethiopian Africa, from *Scotophilus nigrata*, rarely from other species.



Figs. 499, 500. *Basilia (Paracyclopodia) glabra* Theodor. Male. 499. sternite 5 and genital area; 500. genitalia.



Male holotype in the Muséum National d'Histoire Naturelle, Paris, male and female paratype in the Department of Parasitology, Hebrew University, Jerusalem.

***Basilia (Paracyclopodia) glabra* Theodor, 1957**

(Figs. 499, 500)

*Basilia (Paracyclopodia) glabra.* Theodor, 1957, *Parasitology*, **47**, 457.

Length 3 mm. Colour brown. Head with 8 setae at the anterior dorsal margin. Labella of the proboscis as long as the theca.

*Thorax.* Slightly wider than long. Angle of the oblique sutures about 100°. 9–12 notopleural setae. Tibiae long and slender, with 3 rows of setae in the middle of the ventral margin.

*Male abdomen.* Tergite 1 with a double row of short setae at the posterior margin. Tergites 2 and 3 with marginal rows of longer setae. A few short hairs at the sides of the surface of tergite 2. Setae in the marginal rows of tergites 4–6 still longer, but the very long setae present in other species of *Basilia* are absent. Surface of tergites 3–6 bare. Anal segment long, conical. Sternite 1 + 2 rather short, trapezoidal, with a ctenidium of 47 spines and 1–2 setae at the lateral corners. Sternite 5 with a rounded bulge in the middle of the posterior margin which bears a double row of short, thick spines, 8 longer spines in the posterior row and 12 shorter spines in the anterior row. A dense double row of setae laterally.

*Genitalia.* Claspers long, straight, with dark ends. Basal arc broad, rounded, with long anterior process. Phallobase concave dorsally, with 2 setae near the base and 2 apically. Aedeagus curved in an S-shape, of nearly uniform width in the basal two-thirds and tapering to a long point. Apodeme with a broad end-plate. Parameres narrow, nearly straight, with a short, rounded apical end.

Female unknown.

CONGO. Panga, Aruwimi, known only from the male holotype. Musée Royale de l'Afrique Centrale, Tervuren.

***Basilia (Paracyclopodia) madagascarensis* Theodor, 1957**

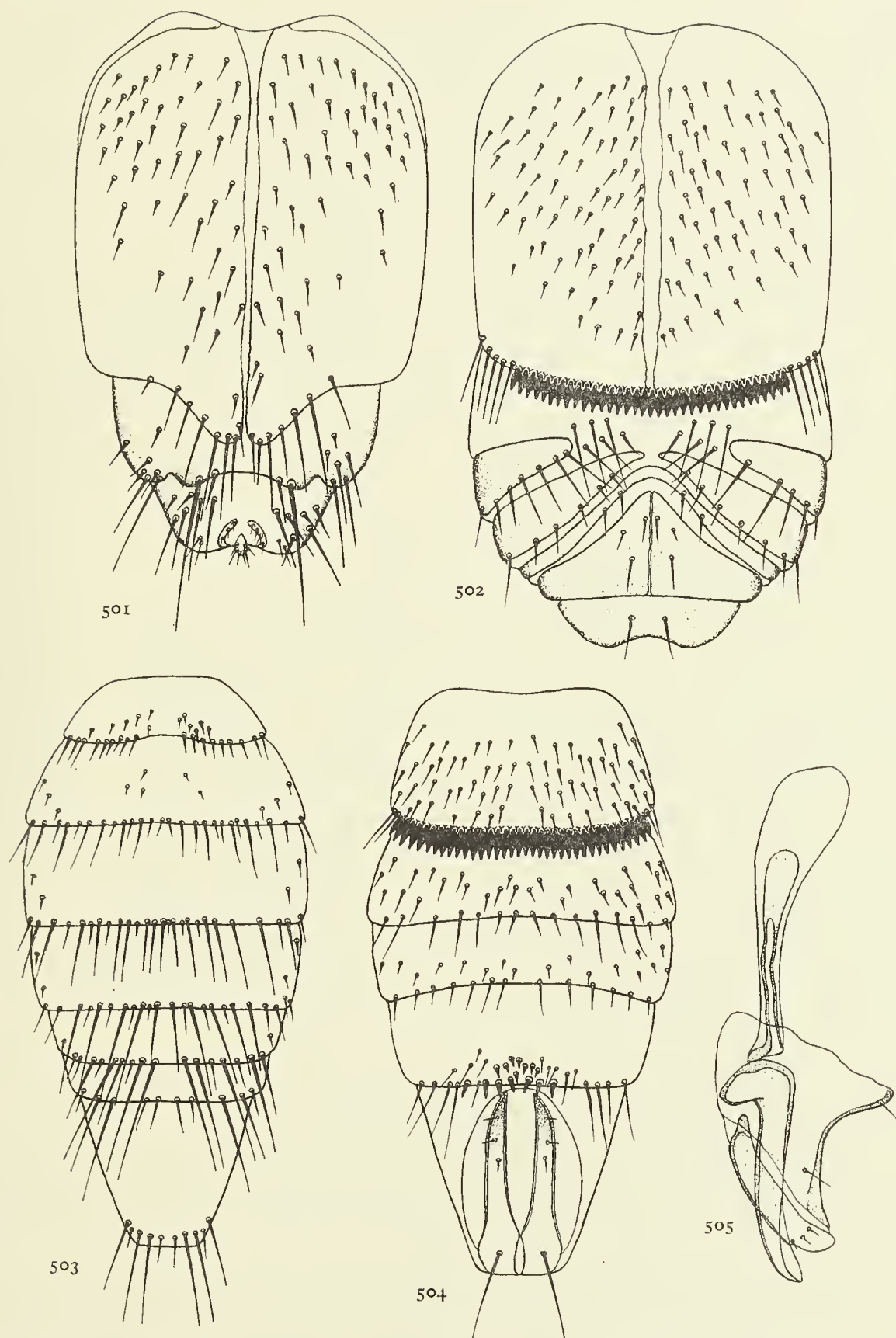
(Figs. 501–505)

*Basilia (Paracyclopodia) madagascarensis.* Theodor, 1957, *Parasitology*, **47**, 457.

Length 2 mm. Colour yellowish brown. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis as long as the theca.

*Thorax.* Slightly wider than long. Angle of oblique sutures about 90°. 11–12 notopleural setae. Tibiae 5 times as long as wide, with 3 rows of short setae in the middle of the ventral margin.

*Male abdomen.* Tergites 2 and 3 with marginal rows of short, widely spaced setae, tergites 4–6 with longer setae. Surface of tergites 2–6 bare, except for a few scattered short hairs. Tergites 5 and 6 much shorter than the preceding tergites. Anal segment short, conical. Sternite 1 + 2 short, with a ctenidium of 36 short, thick spines and 1–2 setae laterally. Sternite 5 with straight posterior margin with a double row of about 10 short, thick spines.



Figs. 501-505. *Basilia (Paracyclopodia) madagascarensis* Theodor. 501. female abdomen, dorsal; 502. same, ventral; 503. male abdomen, dorsal; 504. same, ventral; 505. male genitalia.

*Genitalia.* Claspers thin, straight, with dark ends. Phallobase short, concave dorsally, with 2 setae near the base and 2 further apically. Aedeagus nearly straight, of uniform width in the basal two-thirds and with upturned, tapering apical end. Apodeme short, with a wide end-plate. Parameres narrow, with blunt apical end.

*Female abdomen.* Tergal plate 1 very long, rectangular, divided in the middle, with about 6 setae at the posterior processes and short spines on the surface. Tergal plate 2 transversely rectangular, with 2 long setae in the middle of the posterior margin and longer and shorter setae laterally. Anal segment short, rounded, with a double row of setae around the anus. Sternite 1 + 2 very long, covering two-thirds of the abdomen, with a ctenidium of 36 short, thick spines which do not reach the sides and 3–5 setae laterally. Sternites 3 and 4 with triangular sclerites which are placed obliquely. Sternite 5 strip-like, forming an angle with the apex anteriorly and with 3–4 setae at the posterior margin at each side. Sternite 6 consisting of 2 triangular plates within the angle of sternite 5. Sternite 7 placed vertically to the ventral surface, rectangular. Anal sclerite drop-shaped with several setae.

## MATERIAL IN THE COLLECTION

## MADAGASCAR

Nossi Bé, from *Scotophilus borbonicus*, ♀ holotype, 2 ♂ paratypes (Brit. Mus. 1911.103).

***Basilia (Paracyclopodia) roylly roylly* (Westwood, 1835)**

(Figs. 506–509)

*Nycteribia roylly*. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 290.

*Nycteribia roylly* Westwood. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Nycteribia roylly* Westwood. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

*Nycteribia (Acrocholidia) roylly* Westwood. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia (Acrocholidia) chlamydophora*. Speiser, 1903, *Fasc. Malay. Zool.* **1**, 123.

*Cyclopodia roylly* (Westwood). Scott, 1908, *Trans. Ent. Soc. Lond.* **1908**, 368.

*Cyclopodia roylly* (Westwood). Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209.

*Cyclopodia (Paracyclopodia) roylly* (Westwood). Scott, 1917, *Parasitology*, **9**, 593.

*Cyclopodia (Paracyclopodia) roylly* (Westwood). Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Cyclopodia (Paracyclopodia) roylly* (Westwood). Phillips, 1924, *Spol. Zeyl.* **13**, 65.

*Cyclopodia (Paracyclopodia) roylly* (Westwood). Thompson, 1937, *Jour. Animal Ecol.* **6**, 337.

*Paracyclopodia roylly* (Westwood). Schuurmans Stekhoven & Hardenberg, 1938, *Capit. Zool.* **8**, 1.

*Paracyclopodia roylly* (Westwood). Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 32.

*Basilia (Paracyclopodia) roylly* (Westwood). Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.5–2.75 mm. Colour brown. Head very long, laterally compressed. 6 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax.* Slightly wider than long. Angle of oblique sutures 95°. Lateral plates of the notopleural sutures developed only in the posterior third. 10–12 notopleural setae which begin far posteriorly. Tibiae long, 4–5 times as long as wide, with 3 rows of short setae in the middle of the ventral margin.

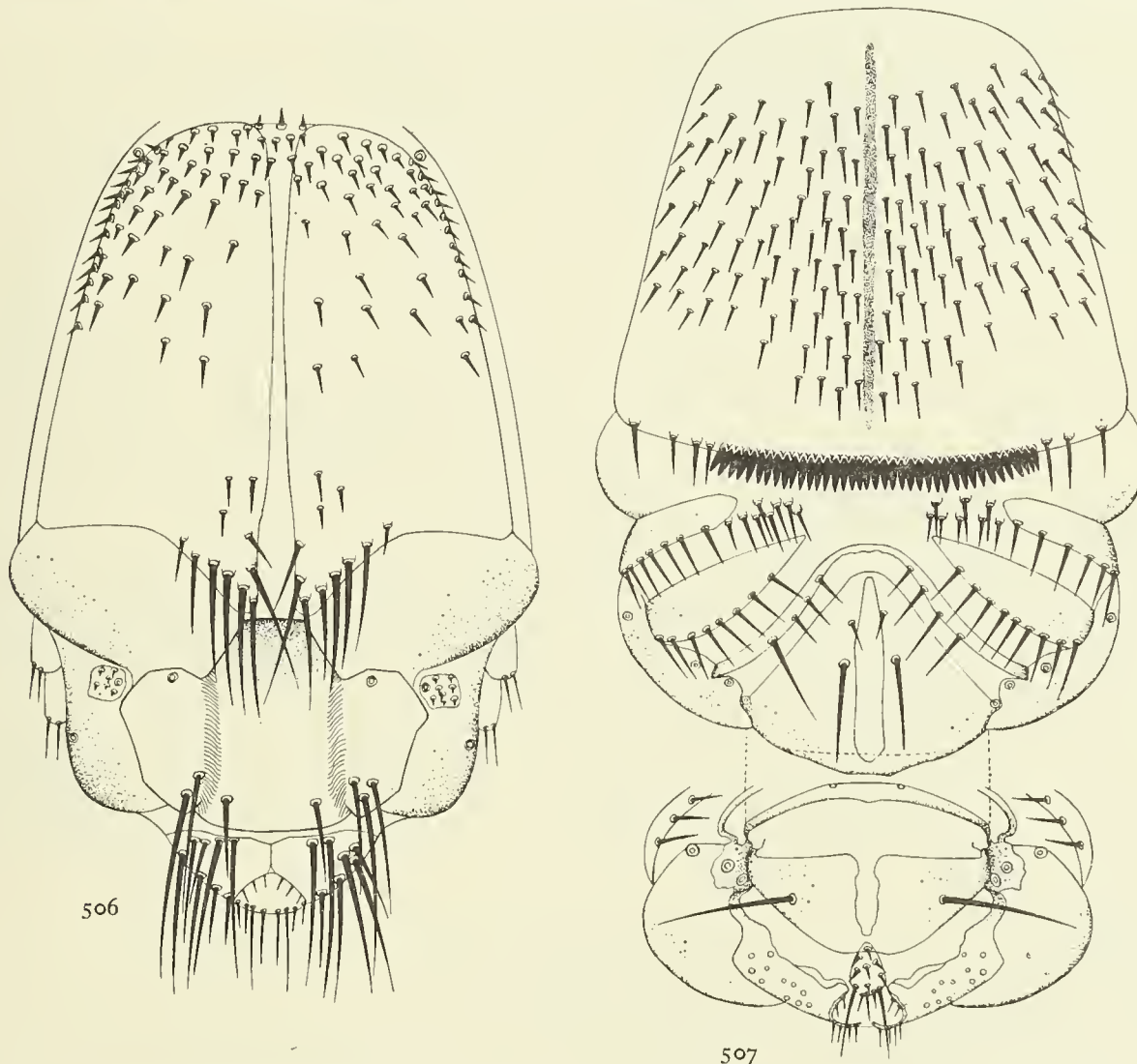
*Male abdomen.* Tergite 1 with a concave posterior margin with a row of short setae or spines. Tergites 2 and 3 with marginal rows of moderately long and short setae. Tergites 4–6 with 2–4 long setae in the middle of the marginal rows. Tergites 2–6 bare on the surface, except for a few scattered spines. Anal segment short, conical, with a row of setae posteriorly, dorsal surface bare. Sternite 1 + 2 with a ctenidium of about 40 spines. Sternite 3 with a marginal row of



setae, sternite 4 with a marginal row of spines only or of very short setae. Sternite 5 with a double row of about 15 short spines at the posterior margin.

*Genitalia.* Basal arc broadly rounded. Claspers short, curved, with dark ends. Aedeagus broad at the base, curved, tapering to a fine point. Parameres with rounded ventral side and blunt apical end.

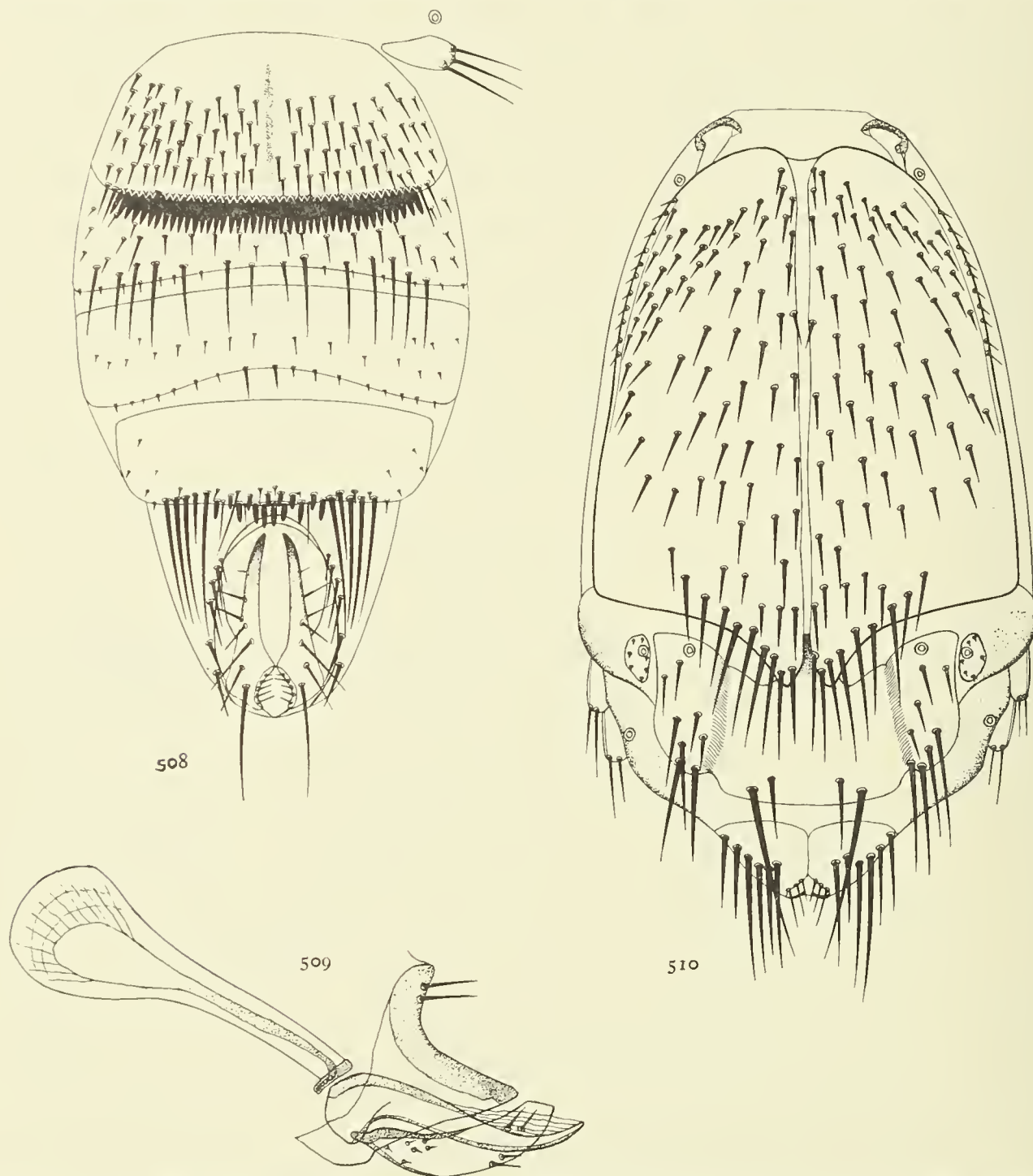
*Female abdomen.* Differing sharply from all other genera, except the new genus *Stereomyia*,



Figs. 506, 507. *Basilia (Paracyclopodia) roylii roylii* (Westwood). Female. 506. abdomen, dorsal; 507. same, ventral, and posterior view.

by the enormous development of the basal tergal plate and sternite and the concentration of all other segments in the posterior third of the abdomen. Tergal plate 1 covers two-thirds of the abdomen, and is incompletely divided in the middle, with two rounded posterior processes with 6–8 moderately long setae. The greater part of the surface is covered with short spines. Tergal plate 2 broad, with an anterior rounded process and spiracle 2 near the anterior margin. 2 long setae in the middle of the posterior margin and 2–3 setae laterally. Spiracle 3 lies inside a small sclerite lateral to tergal plate 2. Spiracle 4 lies inside the pleural membrane. Anal segment very short, conical, with several longer and shorter setae. Sternite 1 + 2 very long, covering two-

thirds of the abdomen, with a ctenidium of 36–40 short spines which do not reach the sides of the posterior margin. 3–4 setae at the sides of the posterior margin. Sternite 3 with lateral triangular sclerites with setae posteriorly which do not reach the midline. A double row of



Figs. 508–510. *Basilium (Paracyclopodia) roylui roylui* (Westwood). 508. male abdomen, ventral; 509. male genitalia; 510. *roylui* *B. roylui burmensis* Theodor, female abdomen, dorsal.

setae between them with a gap in the middle. Sternite 4 with similar sclerites which are larger, but also do not reach the midline. Sternite 5 strip-like, forming an angle with the apex anteriorly, 3–4 setae in each half. Sternite 6 divided into 2 triangular plates which are connected at both

corners. 1–2 setae near the inner margin. Sternite 7 also consisting of 2 triangular sclerites which stand at right-angles to those of sternite 6 and cover the genital opening from below. A long seta in the middle of each half. Anal sclerite elliptical, with a few short and 2 longer setae.

Distribution: China, Japan, India, Ceylon, Burma, Malaya, Java.

MATERIAL IN THE COLLECTION

INDIA

On a large bat, 2 ♀, Hardwicke Bequest (specimens mentioned by Walker, List of Diptera IV, 1148) (Brit. Mus. 41.27).

Helwak near Bombay, Satara district, from *Scotophilus temmincki wroughtoni*, 4.v. 1900, Prof. G. Nuttall, N. C. Rothschild, 1 ♂ 2 ♀.

Pusa, Bihar, from *Scotophilus heathi*, June 1911, T. B. Fletcher, H. Scott, 2 ♂ 1 ♀.

Noshangabad, Central India, from bat, 1912, C. H. Crump, N. C. Rothschild, 3 ♂ 1 ♀.

Balighai, near Puri, Orissa, from *Hesperoctenus tickelli*, 16–20.viii. 1911, Annandale & Gravelly (ex coll. Indian Museum), 2 ♂ 4 ♀.

Madras, from *Megaderma lyra*, 1 ♀ (Brit. Mus. 79.51).

Saidapet, Madras, from *Scotophilus kuhli*, 1.i. 1908, W. S. Patton, N. C. Rothschild, 1 ♀.

Madras, from *Pipistrellus coromandra*, J. G. Jerdon, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

CEYLON

Peradeniya, from *Tylonycteris pachypus*, 9–20.xii. 1911, J. C. F. Fryer, 4 ♂ 3 ♀.

Peradeniya, from *Scotophilus temmincki wroughtoni*, 1912, J. C. F. Fryer, 5 ♂ 3 ♀.

Ambalangoda, from *Scotophilus temmincki wroughtoni*, Jan. 1912, Dr Bugnion, J. C. F. Fryer, 1 ♂ 2 ♀.

Bentota, West coast, Southern prov., from *Scotophilus kuhli*, 2.x. 1921, W. W. A. Phillips, 2 ♂ 2 ♀.

Gonagama, Kitulgala, from *Scotophilus kuhli*, 7.vii. 1925, W. W. A. Phillips, 1 ♂.

Mousakande, Gammaduwa, from *Scotophilus kuhli*, iv. 1926, W. W. A. Phillips, 1 ♀.

Trincomalee, from *Scotophilus temmincki wroughtoni*, 29.viii. 1933, W. W. A. Phillips, 4 ♂ 8 ♀.

Colombo, 5.vii. 1927, G. M. Sturgeon, 1 ♂ 3 ♀.

BURMA

Rangoon, F. S. Meggitt, 1 ♂ 5 ♀ (Brit. Mus. 1931.406).

MALAYA

Bukit Besar, from *Scotophilus temmincki castaneus*, 19.v. 1901, H. C. Robinson & N. Annandale, 1 ♂ 1 ♀ (Brit. Mus. 1903.281).

Jalor, Biserat, from *Scotophilus temmincki castaneus*, 27.vi. 1901, H. C. Robinson & N. Annandale, 1 ♂ 4 ♀ (Brit. Mus. 1903.281).

HOST SYNONYMY

Name on original label  
*Pipistrellus abramus* Temminck.  
*Scotophilus castaneus* Gray.  
*Scotophilus wroughtoni* Thomas.  
*Vesperugo tickelli* Blyth.

Current name  
*Pipistrellus coromandra* Gray.  
*S. temmincki castaneus* Gray.  
*S. temmincki wroughtoni* Thomas.  
*Hesperoptenus tickelli* Blyth.

***Basilia (Paracyclopodia) roylii burmensis* Theodor, 1954**

(Fig. 510)

*Paracyclopodia roylii burmensis*. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, 66a, 33.

This subspecies was described from specimens from Burma. It differs from the typical form by its larger size (3 mm.), and some chaetotactic characters. The hairs on the surface of the basal tergite extend to the posterior margin. The lateral parts of tergal plate 2 are covered with setae. The setae at the side of the ctenidium on sternite 1 + 2 are more numerous. The posterior margin of sternite 5 bears 8–10 hairs. Each plate of sternite 7 bears 2 setae.

Since then, however, specimens of the typical form have been examined from Burma, and specimens of the subspecies have been examined from various localities in India. Specimens with intermediate characters have also been found, so that the value of the subspecies becomes doubtful, and more material will have to be examined to establish the range of variation within the species and the geographical distribution of the various forms.



SUBGENUS **TRIPSELIA** Scott, 1917

*Tripselia* Scott, 1917, *Parasitology*, **9**, 593. Type species: *Tripselia fryeri* Scott.

Head and thorax as in the subgenus *Basilias*, but eyes absent. Legs either very long or normal. Tergite 1 of the female with 2 groups of long setae in most species. Tergal plate 2 of the female abdomen with posterior processes which bear setae or spines, similar to those of the *bathybothyra* group of the subgenus *Basilias*. Tergal plate 2 divided longitudinally into 4 parts in some species. Abdomen of male and genitalia as in the subgenus *Basilias*.

KEY TO THE SPECIES OF *TRIPSELIA*

## FEMALES

1. Legs very long (3.5–4 mm.). Femur 3 nearly twice as long as the thorax. Tibia 3 eight times as long as wide. 2  
     Legs shorter. 3
2. Tergite 1 with 2 groups of 5–6 long setae each. Tergal plate 2 with narrow posterior processes with 1 long and a shorter seta and 4–5 spines. Only very short hairs on the sternal plate of the thorax. Africa, Mauritius, Madagascar (Figs. 516, 517). **B. (T.) blainvillii blainvillii** (p. 304)  
     Oriental Region. **B. (T.) blainvillii amiculata** (p. 307)  
     Tergite 1 with only 3 long and 2–3 shorter setae in each group. Posterior processes of tergal plate 2 broad and with 8 short spines, but no long setae. Posterior margin of the sternal plate with longer and shorter setae. Africa (Figs. 511, 512). **B. (T.) aequisetosa** (p. 303)
3. Very broadly built and hairy species. Tergal plate 2 divided into 4 parallel sclerites. 4  
     Less broadly built and hairy species. Tergal plate 2 heart-shaped and divided into two halves. 5
4. Tergite 1 broadly rounded posteriorly, with 2 groups of about 15 closely standing setae each and a bare concavity between the groups. A bare median strip on tergite 1. New Guinea (Figs. 545–547). **B. (T.) hirsuta** (p. 319)  
     Tergite 1 triangular, with rounded apex which bears 6–8 setae. No bare median strip, surface of tergite 1 uniformly covered with short setae. New Guinea. **B. (T.) horrida** (p. 322)
5. Tergite 1 with short spines or with setae at the posterior margin which are much shorter than the tergite. 6  
     Tergite 1 with 2 groups of setae posteriorly which are markedly longer than the tergite. 8
6. Tergite 1 with 4 short spines at each side of the posterior margin. Tergal plate 2 very short, wider than long, with broadly rounded posterior processes with 3–4 long setae. Tergal plate 3 with 2 posterior processes with 3–4 long setae and spines, widely separated from tergal plate 2 by a connexivum which is densely covered with setae. Anal segment long, conical, bare dorsally, with long posterior processes. Africa (Figs. 531–533). **B. (T.) echinata** (p. 313)  
     Tergite 1 with 2 groups of setae which are about half as long as the tergite. Tergal plate 3 close to tergal plate 2, without any hairs between the two tergites. 7
7. Tergal plate 2 with 2 long setae at the posterior processes. Tergal plate 3 consisting of 2 elongate processes, directed laterally, with 2 spines at the tip. Australia. **B. (T.) burrelli** (p. 310)  
     Tergal plate 2 with 3–4 long setae at the posterior corners. Tergal plate 3 divided into 2 rounded lobes, directed posteriorly, each with 4 setae. Queensland (Fig. 555). **B. (T.) musgravei** (p. 330)
8. Very small species (1.5–1.8 mm.). 9  
     Larger species (2–3 mm.). 11
9. Tergite 1 with 2 groups of 4–5 not very closely standing setae which are not much longer than the tergite. Posterior processes of tergal plate 2 very narrow, with 2 long setae and 3 spines. Tergal plate 3 undivided, small, elliptical, with 2–4 short setae. Australia (Fig. 538). **B. (T.) halei** (p. 317)

- Tergite 1 with 2 groups of 5-6 closely placed setae which are much longer than the tergite. 10
10. Tergal plate 2 with 3-4 setae at the posterior processes. Tergal plate 3 divided into 2 small triangular sclerites, each with 3-4 short setae. Anal segment with setae up to the anterior margin laterally. Borneo (Figs. 522, 523). B. (T.) brevipes (p. 308)  
 Posterior processes of tergal plate 2 very narrow, each with only 2 setae and 2-3 spines. Tergal plate 3 large, rounded, partly divided into 2 rounded halves, each of which bears 6-8 setae. Anal segment with setae only in the posterior part of the sides. Borneo (Figs. 526, 527). B. (T.) coronata (p. 310)
11. Tergite 1 with 2 groups of 6-7 setae. Tergal plate 3 divided into 2 rounded lobes, each with 6-8 short setae or spines. Setae on the posterior processes of tergal plate 2 shorter and thicker than those of tergite 1. Australia (Fig. 564). B. (T.)roughtoni (p. 336)  
 Tergal plate 3 undivided, elliptical. 12
12. Length 3 mm. Tergite 1 with 2 groups of 7-8 long setae. Tergal plate 2 with broad posterior processes with 3-7 long setae and about 20 long, thick spines. Surface nearly completely covered with short setae. Tergal plate 3 rounded, with 2-4 short setae. Australia (Fig. 552). B. (T.) multispinosa (p. 327)  
 Length 2-2.5 mm. 13
13. Tergite 1 with 2 groups of 7-8 closely standing, long setae. Tergal plate 2 with 4-5 setae at the posterior processes. Tergal plate 3 large, rounded, undivided, with 12 setae. Anal segment laterally with setae up to the anterior margin. Borneo. B. (T.) major (p. 326)  
 Tergal plate 3 smaller, with only 4-6 setae. 14
14. Tergite 1 with 2 groups of 3-5 setae. Tergal plate 2 with 2-3 setae at the posterior processes. Tergal plate 3 with 2-4 short setae. Anal segment bare dorsally and laterally except for 2-4 short setae posteriorly and some setae at the posterior margin. Australia (Figs. 534, 535). B. (T.) falcozi (p. 315)  
 Tergite 1 with 2 groups of 7-8 long setae. 15
15. Length 2 mm. Posterior processes of tergal plate 2 very broad, with 3-5 long setae. Genital plate with 4 setae. Anal sclerite small, with 2 setae. Sumatra (Fig. 556). B. (T.) peselefantis (p. 331)  
 Length 2.5 mm. Posterior processes of tergal plate 2 narrower, with 4-6 long setae. Genital plate apparently without setae. Anal sclerite very long and narrow, with 2 setae posteriorly. Australia (Fig. 548). B. (T.) longispinosa (p. 323)

MALES

1. Sternal plate of the thorax nearly square. Abdominal ctenidium consisting of short, rounded, club-shaped spines which are little longer than wide. Sternite 5 with a triangular group of short spines, about 30 in 4 rows. Claspers black, thick at the base and tapering to a long, thin end. New Guinea (Figs. 559-561). B. (T.) quadrata (p. 333)  
 Abdominal ctenidium consisting of long spines. Claspers different. 2
2. Legs very long, 3.5-4 mm. Femur 3 nearly twice as long as the thorax. Hind-tibia 8 times as long as wide. 3  
 Legs shorter. 4
3. Posterior margin of the sternal plate of the thorax with only very short hairs. Tergites 3 and 4 with several rows of hairs on the surface. Tergite 5 with only one row. Sternite 5 with about 25 spines in 2 rows at the posterior margin. Africa, Mauritius, Madagascar (Figs. 518-520). B. (T.) blainvillii blainvillii (p. 304)  
 Oriental Region. B. (T.) blainvillii amiculata (p. 307)  
 Posterior margin of the sternal plate with longer and shorter setae. Africa. Otherwise like *B. blainvillii*. Africa (Fig. 512). B. (T.) aequisetosa (p. 303)

4. Very broadly built and hairy species. Sternite 1 + 2 with a premarginal row of long setae and 1-3 long setae at the sides of the abdominal ctenidium. Aedeagus slightly curved, tapering. Parameres with a ventral tooth. New Guinea (Figs. 541-544). **B. (T.) hirsuta** (p. 319)  
 Similar, but premarginal row of long setae on sternite 1 + 2 and lateral groups of long setae on sternites 3-5 absent. New Guinea. **B. (T.) horrida** (p. 322)  
 Less hairy and less broadly built species. 5
5. Very small species (1.5-1.8 mm.). 6  
 Larger species (2-3 mm.). 8
6. Tergites 3-6 bare on the surface. Sternite 5 with a group of 12-14 spines in 2 rows. Aedeagus straight. Parameres with a ventral tooth. Australia (Figs. 539, 540). **B. (T.) halei** (p. 317)  
 Tergites 3-5 with groups of hairs on the surface. Aedeagus curved. Parameres without ventral tooth. 7
7. Marginal setae on tergites 3 and 4 longer than the tergite. Sternite 5 with a group of about 24 spines. Borneo (Figs. 524, 525). **B. (T.) brevipes** (p. 308)  
 Marginal setae of tergites 3 and 4 shorter than the tergite. Sternite 5 with a group of about 16 spines. Borneo (Figs. 528, 529). **B. (T.) coronata** (p. 310)
8. Length 3 mm. Heavily sclerotized. Tergites 2-5 with numerous hairs on the surface. Tergite 6 bare, except for a few premarginal setae. Aedeagus straight, tapering to a point. Parameres with a large ventral tooth. Australia (Figs. 553, 554). **B. (T.) multispinosa** (p. 327)  
 Length 2-2.5 mm. 9
9. Aedeagus straight. 10  
 Aedeagus curved. 11
10. Tergite 3 with a double row, tergite 4 with a single row of hairs on the surface. Tergite 5 with only a few hairs. Tergite 6 bare. Sternite 5 with a group of about 20 spines. Parameres with a large ventral tooth. Australia (Figs. 536, 537). **B. (T.) falcozi** (p. 315)  
 Tergites 3-5 with several rows of hairs on the surface. Tergite 6 almost bare. Sternite 5 with a group of about 26 spines. Parameres broadly triangular, with a sharp apical end and an obtuse ventral angle. Australia (Figs. 549, 550). **B. (T.) longispinosa** (p. 323)
11. Tergites 3-6 bare. Sternite 5 with a group of about 30 spines. Aedeagus broad at the base, tapering to a point, curved in the apical half. Parameres with a triangular apical end. Australia (Figs. 565, 566). **B. (T.)roughtoni** (p. 336)  
 Tergites 3-5 with hairs on the surface. 12
12. Tergite 6 with a premarginal row of setae on the surface. Sternite 5 with a group of about 38 spines in 3 rows. Parameres with a broadly rounded end and a small ventral tooth. Aedeagus 0.3 mm. long. Anal segment covered with hairs dorsally, nearly reaching to the anterior margin. Malaya (Figs. 562, 563). **B. (T.) triseriata** (p. 335)  
 Tergite 6 bare. Parameres triangular, with rounded point and obtuse ventral angle. Sternite 5 with a group of 22-25 spines. Anal segment with hairs limited to the posterior half of the dorsal surface. 13
13. Sternite 5 with a group of 25 spines. Aedeagus 0.19 mm. long, 6 times as long as wide in the middle. Sumatra (Figs. 557, 558). **B. (T.) peselefantis** (p. 331)  
 Sternite 5 with only 12 spines. Aedeagus 0.25 mm. long, 9 times as long as wide in the middle. Borneo (Fig. 551). **B. (T.) major** (p. 326)

The males of *B. echinata* and *B. musgravei* and the females of *B. quadrata* and *B. triseriata* are unknown.

The keys are unsatisfactory in some respects, since there is insufficient material available, and characters considered here as specific may eventually prove to be only subspecific or even within the range of variation of a species.



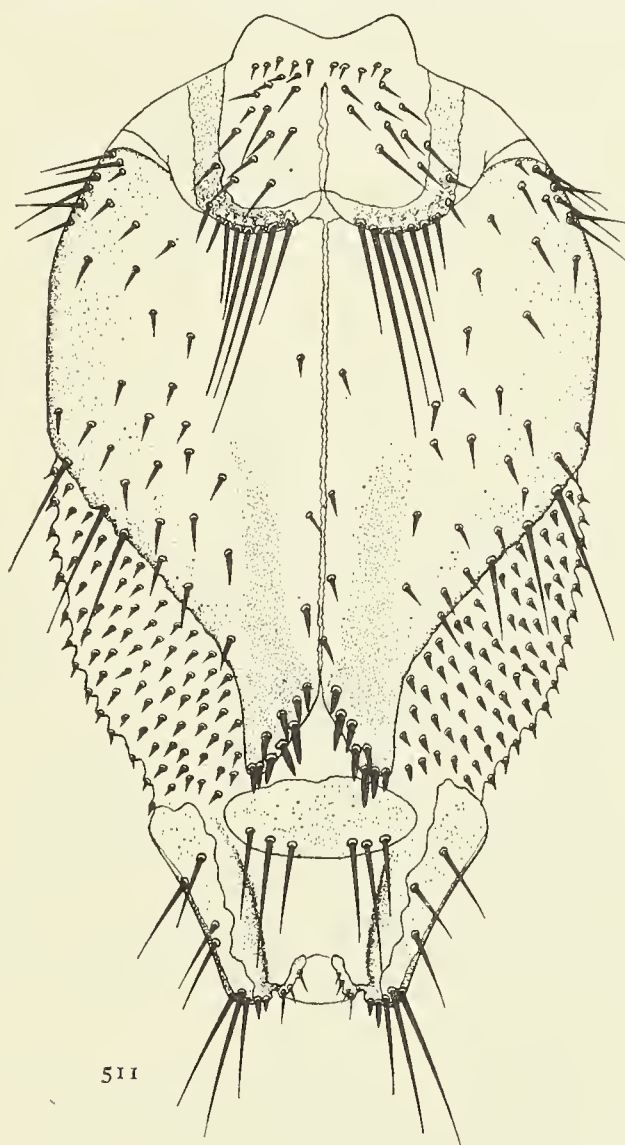
***Basilias (Tripselia) aequisetosa* (Theodor, 1956)**

(Figs. 511, 512)

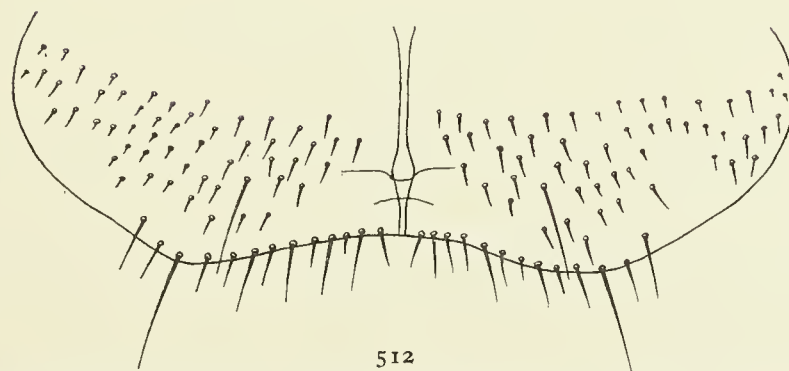
*Tripselia aequisetosa*. Theodor, 1956, *Parasitology*, **46**, 353.

*Tripselia aequisetosa* Theodor. Theodor, 1957, *Parasitology*, **47**, 457.

Head and thorax as in *B. blainvillii*, except that the row of hairs at the posterior margin of the



511



512

Figs. 511, 512. *Basilias (Tripselia) aequisetosa* (Theodor). Female. 511. abdomen, dorsal; 512. postero-ventral margin of thorax.

sternal plate of the thorax consists of longer setae, of which one near the side is the longest. Legs as in *B. blainvillii*, but even longer. The main difference is in the abdomen of the female. There are only 2–3 long setae on tergite 1 at each side and the median seta is about half as long as the next, so that the groups of long setae appear triangular. The posterior processes of tergal plate 2 are much broader than in *B. blainvillii* and bear no long setae, but only an irregular row of 6–9 spines of about equal length.

## MATERIAL IN THE COLLECTION

## NIGERIA

Lagos, from *Taphozous peli*, 25.xii. 1919, W. P. Lowe,  
♀ holotype, 1 ♂ 1 ♀ paratypes (Brit. Mus. 1920.502).

## CONGO

Medje, from *Taphozous peli*, vii. 1916, J. Bequaert,  
H. Scott, 1 ♀.

***Basilia (Tripselia) blainvillii blainvillii* (Leach, 1817)**

(Figs. 513–520)

*Phthiridium blainvillii*. Leach, 1817, *Zool. Misc.* 3, 54.

*Nycteribia blainvillii* Leach. Westwood, 1835, *Trans. Zool. Soc. Lond.* 1, 275.

*Nycteribia blainvillii* Leach. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Nycteribia blainvillii* Leach. Kolenati, 1863, *Hor. Soc. Ent. Ross.* 2, 9.

*Nycteribia blainvillii* Leach. Speiser, 1901, *Arch. f. Naturgesch.* 67, 11. (Only the record from Mauritius, the record and the description of the specimens from Egypt refer to *Stylidia integra*.)

*Nycteribia (Acrocholidia) fryeri*. Scott, 1914, *Trans. Linn. Soc. Lond. (Zool.)* 17, 161.

*Tripselia fryeri* Scott. Scott, 1917, *Parasitology*, 9, 593.

*Tripselia amiculata* Speiser. Scott, 1925, *Rec. Ind. Mus.* 27, 351. (Records from Assumption Island and Tropical Africa.)

*Tripselia fryeri* Scott. Falcoz, 1924, *Bull. Mus. Nat. Hist. Natur. Paris*, 30, 223.

*Nycteribia reichenowi*. Karaman, 1948, *Rad. Acad. Jugoslav.* 273, 117.

*Tripselia blainvillii blainvillii* Leach. Theodor, 1956, *Parasitology*, 46, 353.

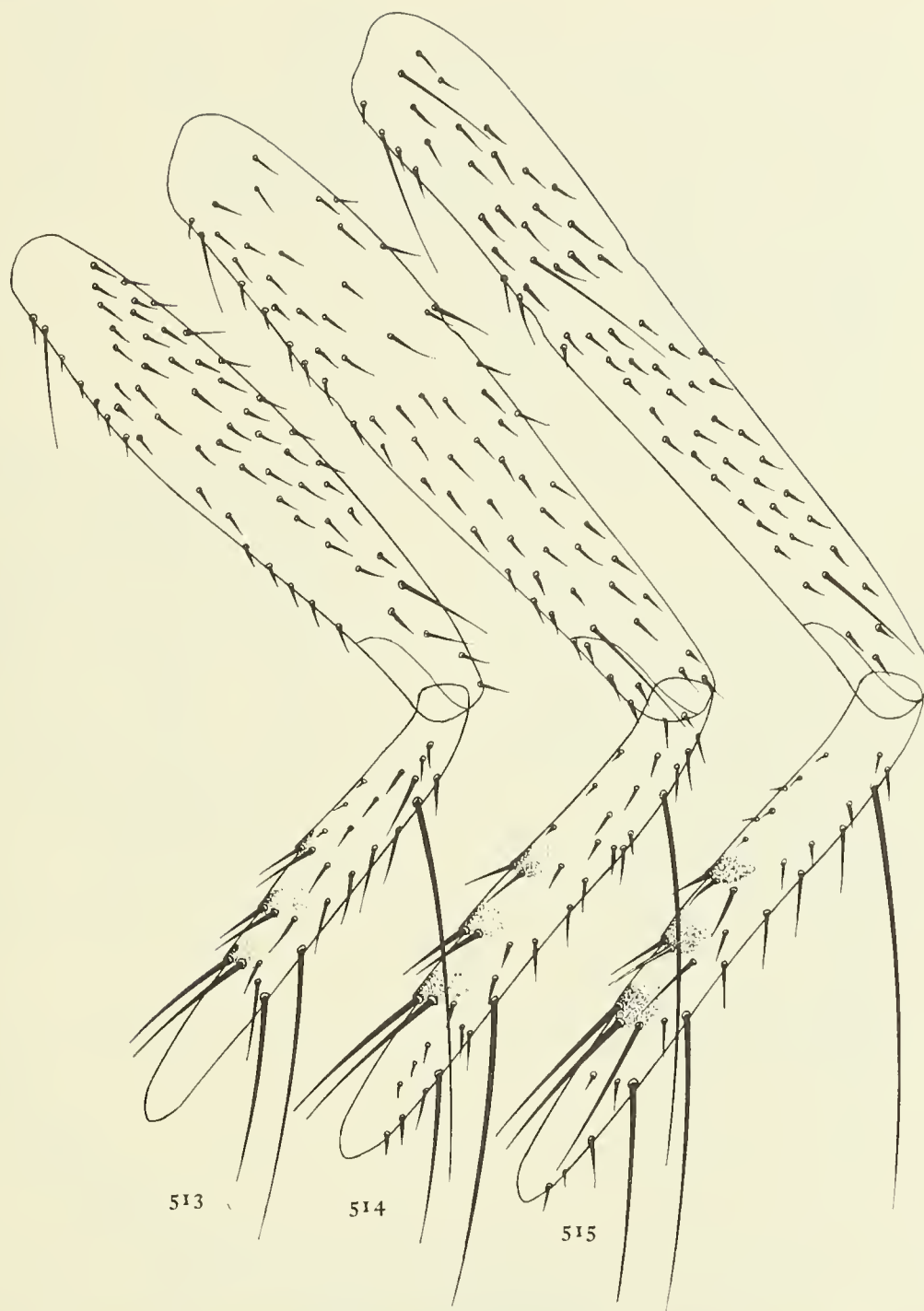
*Tripselia blainvillii* Leach. Theodor, 1957, *Parasitology*, 47, 457.

Length 2.5 mm. Colour brown. Head laterally compressed. The anterior dorsal margin forms an angle with 3 setae at each side. Labella of the proboscis as long as the theca, or slightly shorter.

*Thorax*. Slightly wider than long. Angle of oblique sutures 90°. Lateral plates of the notopleural sutures wide, with a row of 8–11 notopleural setae. Legs very long and slender, 3.5–4 mm. Tibiae 8 times as long as wide, with 3 rows of short setae in the middle.

*Male abdomen*. Tergite 2 with a marginal row of moderately long and shorter setae and 2–3 rows of short setae on the surface. Tergites 3–6 with similar marginal rows, but with 2–4 very long and thick setae in the marginal rows of tergites 5 and 6. Tergites 3 and 4 with 2–3 rows of hairs on the surface, tergite 5 with one row, tergite 6 bare. Anal segment about as long as the 3 preceding tergites, conical, with longer and shorter setae on the dorsum and longer setae posteriorly. Sternite 5 rounded posteriorly, with a double row of short, thick spines. The posterior row consists of 12–14 longer spines, the anterior row of 10–14 shorter spines, which are placed more closely together.

*Genitalia*. Claspers long and thin, darkly pigmented, slightly curved. Basal arc rounded with long anterior process. Phallobase concave dorsally, with 2 pairs of setae near the base and

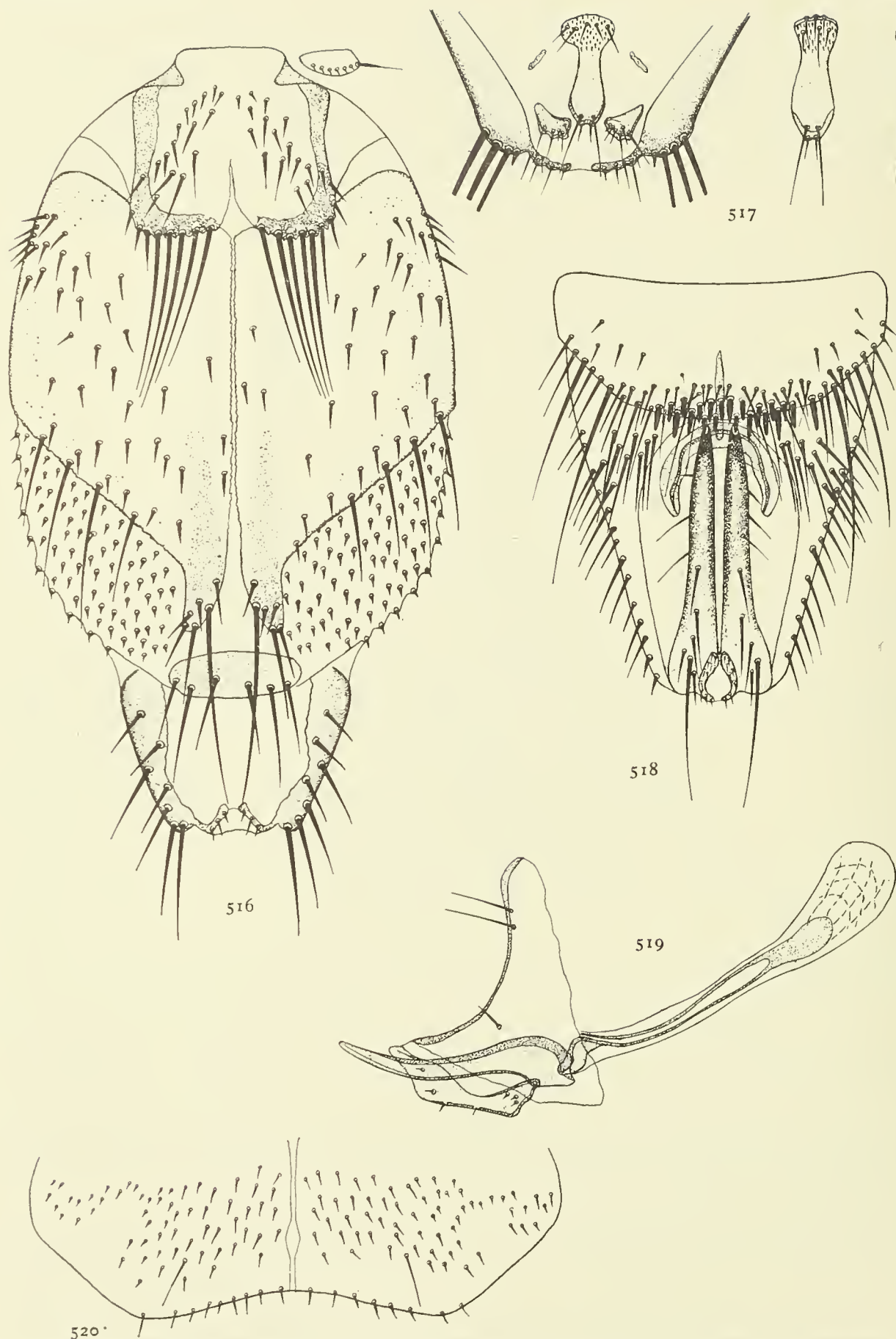


Figs. 513-515. *Basilia (Tripselia) blainvillii blainvillii* (Leach). Femur and tibia of legs 1-3 respectively.

another pair further apically. Aedeagus uniformly tapering to a point, slightly curved. Apodeme with a wide end-plate. Parameres with blunt tip and an obtuse ventral angle.

*Female abdomen.* Tergite 1 forms 2 broad lobes posteriorly, each of which bears about 5 long setae of equal length. Tergal plate 2 heart-shaped, divided in the middle. The posterior processes are narrow and pointed and bear a long seta, a shorter one at the tip and 4-5 short spines. Pigmented stripes run from the processes into the middle of the lateral sclerites. 3-5 short setae at the lateral margins and short setae on the surface. Pleurae covered with short spines.





Figs. 516-520. *Basilia (Tripselia) blainvillii blainvillii* (Leach). 516. female abdomen, dorsal; 517. female genital plate and anal sclerites; 518. male sternite 5 and genital area; 519. male genitalia; 520. postero-ventral margin of thorax.

Tergal plate 3 transversely elliptical, with 4–8 short setae posteriorly. Anal segment short, truncate, sclerotized at the sides, bare dorsally and with short setae laterally and longer setae posteriorly. Sternite 1 + 2 with a ctenidium of 50–55 spines. Sternite 5 with narrow, widely separated lateral sclerites and 4–6 setae between them. Sternite 6 with broader sclerites which do not quite reach the midline. Sternite 7 rounded posteriorly with long setae in the middle of the posterior margin. The dorsal part of the anal frame is connected with the lateral sclerite of the anal segment. Ventrally, a part of the anal frame has become separated and forms adanal plates. Between them an elliptical anal sclerite with 2 longer and 2 shorter setae posteriorly. Genital plate with 4 setae on an area of minute spines, sometimes connected with the anal sclerite.

Distribution and hosts: Mauritius, Assumption Islands, Madagascar, Tropical Africa between 10° lat. North and South. (Map 2.) Mainly from *Taphozous mauritanus*.

#### MATERIAL IN THE COLLECTION

##### MAURITIUS

♂ holotype. 'The label is very possibly in Leach's handwriting. This is the specimen referred to by Walker, List Dipt. IV. 1148.' E. E. Austen.

##### CONGO

Mboga, Ituri Forest, from *Taphozous mauritanus*, iii–iv. 1930, Lord Howard de Walden Expedition, 3 ♀ (Brit. Mus. 1930.321).

##### ASSUMPTION ISLANDS

From *Taphozous mauritanus*, ix. 1908, 1 ♂ 1 ♀ types, 4 ♀ paratypes of *T. fryeri* Scott. Percy Sladen Trust (Brit. Mus. 1914.473).

##### KENYA

Kiambu, viii. 1950, P. C. C. Garnham, 2 ♀.

##### GOLD COAST

Accra, 9.i. 1910, J. W. S. Macfie, 1 ♂ (Brit. Mus. 1946.326).

Accra, from grey house bat, 1.xi. 1915, Bromer, 1 ♂ 2 ♀ (Brit. Mus. 1916.259).

##### TANGANYIKA

Kilosa, from *Taphozous mauritanus*, 8.i. 1921, A. Loveridge, N. C. Rothschild, 1 ♀.

#### OTHER MATERIAL EXAMINED

Numerous specimens from Sierra Leone, Cameroons, Angola, Sudan and Madagascar, mostly from *Taphozous mauritanus*.

### ***Basilia* (*Tripselia*) *blainvillii* *amiculata* (Speiser, 1907)**

*Cyclopodia amiculata*. Speiser, 1907, *Rec. Ind. Mus.* **1**, 295.

*Tripselia fryeri* (Scott). Falcoz, 1924, *Bull. Mus. Nat. Hist. Natur. Paris*, **30**, 223 (record from Labuan).

*Tripselia amiculata* (Speiser). Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (Asiatic records).

*Tripselia fryeri* (Scott). Phillips, 1924, *Spol. Zeyl.* **13**, 65.

*Tripselia amiculata* (Speiser). Thompson, 1937, *Jour. Animal Ecol.* **6**, 337.

*Tripselia blainvillii amiculata* (Speiser). Theodor, 1956, *Parasitology*, **46**, 353.

Specimens from Asia (Calcutta, Burma, Ceylon, Sumatra) are smaller and more slender than the African specimens. The setae on the surface of tergal plate 2 of the female are less numerous, there are only 2–3 setae at the posterior lateral margin and the setae at the posterior processes are shorter. The abdominal ctenidium has only 40–45 spines. The males have 5–6 rows of short setae on tergite 2 and the group of spines on sternite 5 differs in some specimens. Sternite 5 is narrower and less curved posteriorly and the setae are shorter. There is no difference in the genitalia.

MATERIAL IN THE COLLECTION

CEYLON

Anasigalla, Matugama, Kalutara, from *Taphozous longimanus*, 18.x. 1921, W. W. A. Phillips, 1 ♀.  
Mousakande, Gammaduwa, East Matale, from *Taphozous saccolaimus*, 6.iv. 1925, W. W. A. Phillips, 1 ♀.  
Trincomalee, from *Taphozous saccolaimus*, 29.viii. 1933, W. W. A. Phillips, 1 ♀.

BORNEO

Labuan, from *Taphozous saccolaimus*, 1 ♀ (Brit. Mus. 78.6).

SUMATRA

Balige, x. 1890–iii. 1891, E. Modigliani, ex Mus. Genoa, N. C. Rothschild, 1 ♂.

OTHER MATERIAL EXAMINED

Specimens from Calcutta (neo-type), Burma and Sumatra, from *Taphozous longimanus*.

HOST SYNONYMY

Name on original label  
*Saccolaimus saccolaimus* Temminck.

Current name  
*Taphozous saccolaimus* Temminck.

**Basilias (Tripselia) brevipes** (Theodor, 1956)

(Figs. 521–525)

*Tripselia brevipes*. Theodor, 1956, *Parasitology*, **46**, 353.

Length 1.5–2 mm. Colour light brown. Head as in *B. blainvillii*. Labella of the proboscis about half the length of the theca.

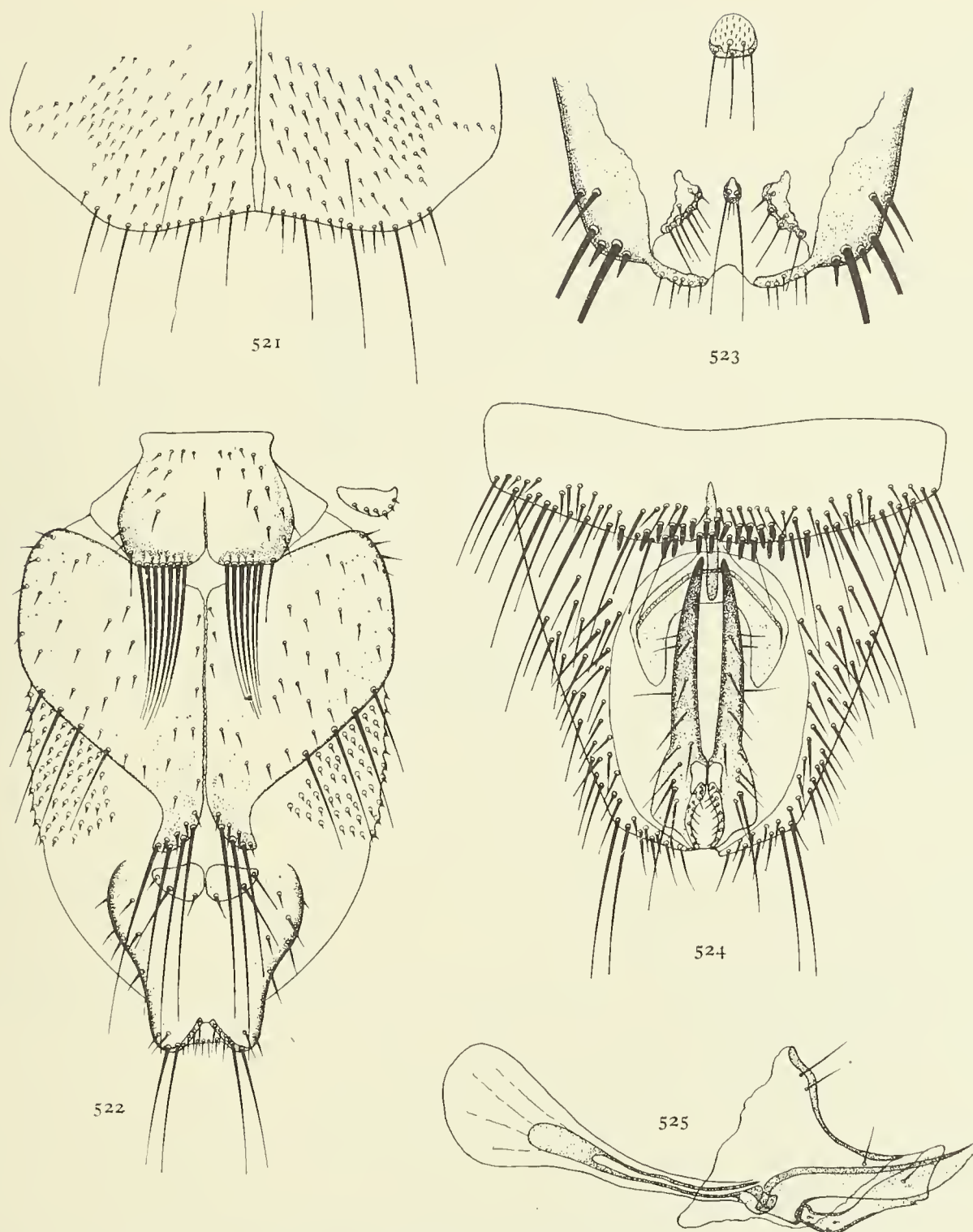
*Thorax*. Wider than long. Length to width = 4 : 5. Legs much shorter than in *B. blainvillii*, fore-leg = 2.5 mm., hind-leg = 3 mm. long. Tibiae 4–4.5 times as long as wide, with 3 rows of setae in the distal half of the ventral edge.

*Male abdomen*. Tergites 2–6 with marginal rows of moderately long and shorter setae. The setae are longer on the posterior tergites and there are 2–4 very long setae on tergites 5 and 6. Tergites 2–5 with short setae on the surface and only a few or none on tergite 6. Anal segment nearly parallel-sided, with long and short setae on the dorsum and long setae posteriorly. Sternite 1 + 2 with a ctenidium of 55–60 spines which are shorter than in *B. blainvillii*. Sternite 5 with a group of 24–28 spines in 2 rows, those of the posterior row longer and more widely spaced.

*Genitalia*. Basal arc rounded, with moderately long anterior process. Phallobase concave dorsally, with 4 setae near the base and 2 others further apically. Aedeagus with a sharp angle near the base, widening slightly in the apical half and tapering to a blunt point. Apodeme short, with a wide end-plate. Parameres with a blunt apical end and obtuse ventral angle which sometimes has a short tooth.

*Female abdomen*. Tergite 1 with 2 lobes posteriorly which bear groups of 6–7 long setae of about equal length. Tergal plate 2 shorter than in *B. blainvillii*. Posterior processes rather short, slightly turned outwards, with 3–4 setae and a few spines. Short setae on the surface, except in the anterior median part. 4–5 long setae at the lateral margins. Tergal plate 3 divided into triangular plates, each of which bears 3 setae. Anal segment narrow, conical, bare dorsally and with some short setae laterally and long setae posteriorly. Anterior part of the pleurae covered with minute spines. Lateral sclerites of sternite 5 wide and narrow, with 2–4 setae between them. Lateral sclerites of sternite 6 wider, reaching to the midline, partly fused with sternite 7. Sternite 7 broadly rounded, with long setae at the posterior margin and a group of closely





Figs. 521–525. *Basilia (Tripselia) brevipes* (Theodor). 521. postero-ventral margin of thorax; 522. female abdomen, dorsal; 523. female genital plate and anal sclerites; 524. male sternite 5 and genital area; 525. male genitalia.

placed setae in the middle. Anal sclerite small and rounded, with 2 longer and 2 shorter setae. Adanal plates with 4 setae and a few spines. Genital plate small, rounded, with 3–4 longer setae posteriorly and 2–3 shorter setae in the middle.

## MATERIAL IN THE COLLECTION

## BORNEO

Boentok, Baribok, Central Borneo, from *Pipistrellus imbricatus*, ♀ holotype, 4 ♂ 4 ♀ paratypes. G. C. Shortridge, N. C. Rothschild (Brit. Mus. 1913.450).

## INDIA

Astoli, Bolgaum, Bombay, from *Tylonycteris pachypus*, R. E. Wroughton, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).

***Basilias (Tripselia) burrelli* (Musgrave, 1927)**

*Nycteribia burrelli*. Musgrave, 1927, *Rec. Austr. Mus.* **15**, 263.

Material not seen, description modified after Musgrave.

Length 2–2.3 mm. Thorax with about 12 notopleural setae.

*Male abdomen*. Tergites 2–4 with marginal rows of moderately long setae. Tergites 5 and 6 with longer setae in the marginal rows. Short hairs on the surface of tergites 2 and 3, tergites 4–6 bare. Sternite 1 + 2 with a ctenidium of 60 spines. Sternite 5 with a group of spines in 2 rows, 8 in the anterior, 11 in the posterior row. Genitalia not described.

*Female abdomen*. Tergite 1 with a marginal row of 2–3 short setae and spines at each side of the median gap. Tergal plate 2 heart-shaped with narrow posterior processes with 2 long setae and some spines. Surface covered with short hairs. Tergal plate 3 represented by 2 slender lateral processes which are directed laterally and have 2–3 short setae at the tip. Anal segment nearly parallel-sided, bare on the dorsal surface and with setae and spines posteriorly.

Distribution and host: Australia, New South Wales, from *Chalinolobus morio*.

Type series in the Australian Museum, Sydney.

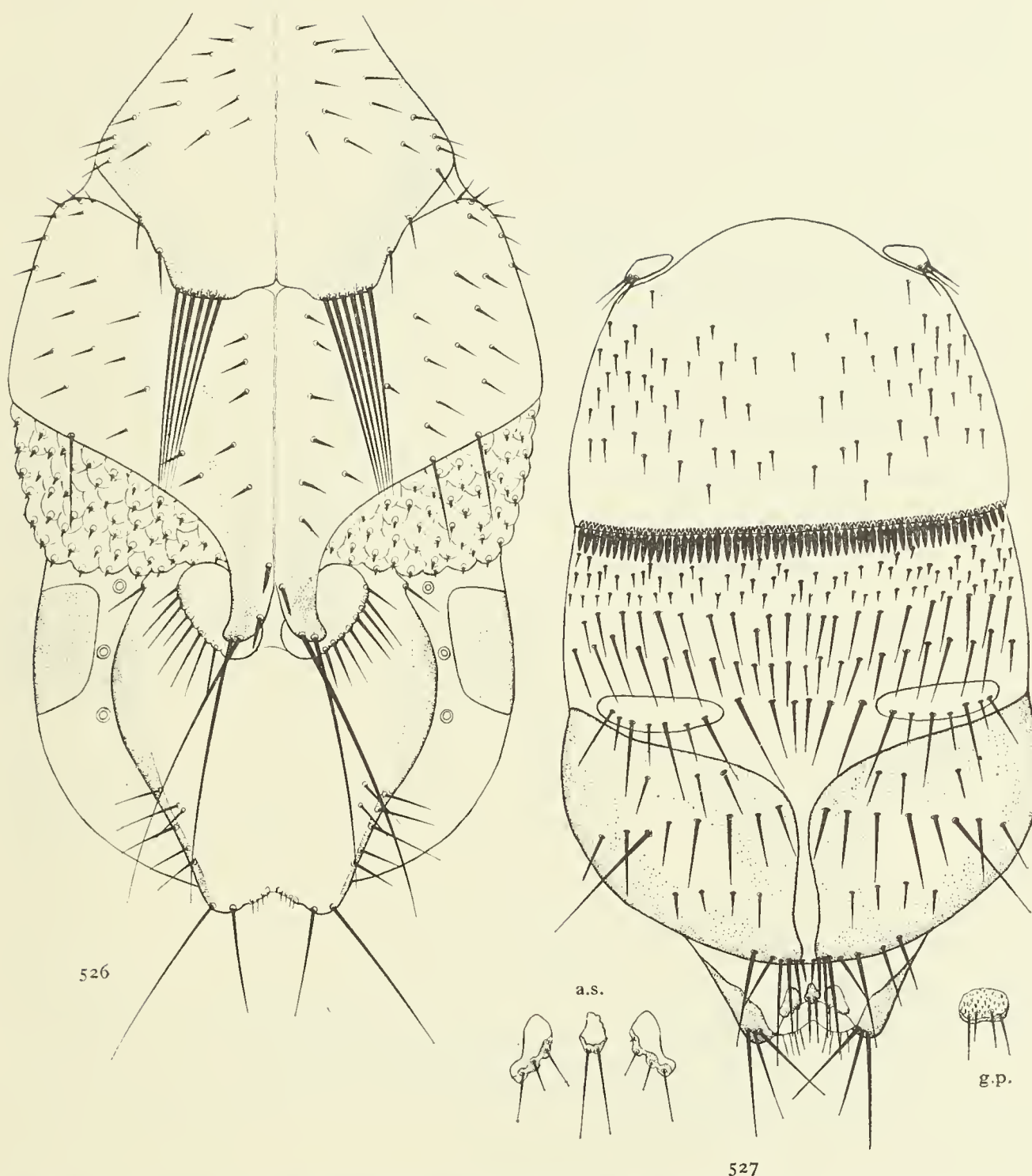
***Basilias (Tripselia) coronata coronata* n.sp. and subsp.**

(Figs. 526–529)

Length 1.5–1.75 mm. Colour brown. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax*. Rectangular, slightly wider than long. Length to width = 5 : 6. Angle of oblique sutures 90°. Posterior margin of the sternal plate with a row of short setae and 3 longer setae in each half. Median suture indistinct in the middle. Mesonotum wide. 10 notopleural setae. Tibiae 4.5 times as long as wide, with long tapering apical ends.

*Male abdomen*. Post-spiracular sclerite short, rounded, with a short seta near the spiracle and 3–4 short spines. Tergite 1 with a marginal row of short setae with a gap in the middle. Tergites 2–4 with marginal rows of short setae and spines. Surface of tergite 2 covered with short setae, about 20 setae on tergites 3 and 4. Marginal rows of tergites 5 and 6 with longer setae, 2 near the middle very long. Only a few setae on the surface of tergite 5, tergite 6 bare. Anal segment conical, with longer setae posteriorly and 2 rows on the dorsal surface. Sternite 1 + 2 with a ctenidium of 56–60 spines and 3–4 rows of short setae on the surface. Sternites 3 and 4 with marginal rows of shorter setae in the middle and longer setae laterally. 1–2 rows of short setae on the surface of sternite 3 and only a few premarginal hairs on sternite 4 laterally. Sternite 5 longer than 4, with convex posterior margin and a group of spines in 2 rows, 8–10 longer, more widely spaced spines in the posterior row and 6–8 more closely placed spines in the anterior row.



Figs. 526, 527. *Basilia (Tripselia) coronata coronata* n.sp. and subsp. Female. 526. abdomen, dorsal; 527. same, ventral, with genital plate and anal sclerites.

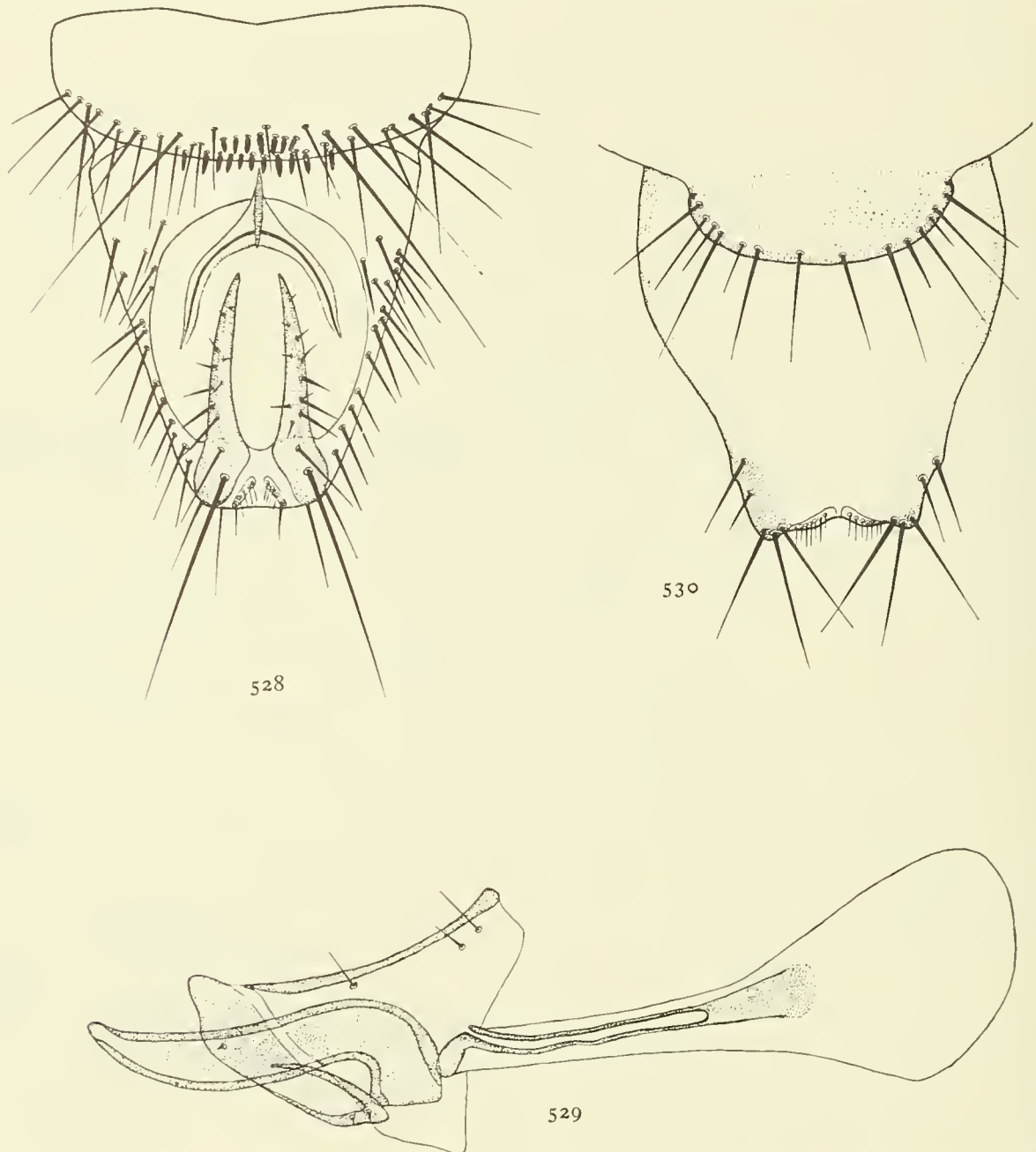
One long and several shorter setae laterally to the group of spines and a premarginal row of long and short setae. Anal segment with setae laterally on the ventral surface.

**Genitalia.** Basal arc rounded, with a long anterior process. Claspers short, slightly curved, pigmented, with a long seta near the base dorsally and shorter setae up to half the length of the clasper. Aedeagus short, 6 times as long as wide, with a marked angle near the base, with thick



basal two-thirds and a short, pointed end. Apodeme short, with a wide end-plate. Paramere with triangular apical end and a rounded ventral angle.

*Female abdomen.* Tergite 1 with a median incision of the posterior margin which forms two lobes, each of which bears 5-6 long setae, 2-3 spines at the lateral margin and some spines on the



Figs. 528-530. *Basilias (Tripselia) coronata coronata* n.sp. Male. 528. sternite and 5 genital area; 529. genitalia and subsp.; 530. *B. (Tripselia) coronata indivisa* n.subsp. Female. Tergal plate 3 and anal segment.

surface. Tergal plate 2 wider than long, divided in the middle, with 2 very narrow posterior processes which bear 1-2 very long setae and 2-3 spines. Short spines on the surface along the median line and laterally, leaving a bare area anteriorly and laterally which is less heavily sclerotized than the rest of the sclerite; 3-4 setae at the lateral oblique margins. Tergal plate 3 transversely elliptical, divided into lateral sclerites, each bearing 6-8 setae; there is a gap between

the two median setae. Tergal plate 3 partly covers the anal segment. This is very large, conical, with bulging sides anteriorly and bears 6–8 setae posteriorly at the sides and 3–4 long setae at the anal processes. Spiracles 6 and 7 lie lateral to the anal segment. Sternite 1 + 2 very large, with a ctenidium of 56 short spines. Sternites 3 and 4 with short setae in the marginal rows and with 3–4 rows of short hairs on sternite 3. Sternite 4 very short and with bare surface. Sternite 5 with narrow transversely elliptical sclerites which do not reach the midline; there are 6 setae between them which continue on to the posterior margin of the sclerites. Sternites 6 and 7 fused, forming large triangular sclerites which are rounded posteriorly; a transverse row of setae on the surface represents the marginal row of sternite 6; a row of short setae is present at the posterior margin in the middle and longer setae laterally. Genital plate small, with 3–4 setae on an area of minute spines. Anal sclerite small, elliptical, with 2 setae. Adanal plates elliptical, with 2–3 longer setae and 2 short ones.

BORNEO. Sarawak, Tinjar, Fort Teju, 18.vi. 1950, Harrison, Insoll and Johan, ♀ holotype and 4 ♂, 6 ♀ paratypes. Chicago Natural History Museum.

Long Keluak, Ulu Belaga, in bamboo, 1.vii. 1950, Harrison, Insoll and Johan, 2 ♂ 1 ♀. RTB-7828.

Mt Kinabalu, Bundu Tuhan, 26.v. 1952, 8 ♂ 4 ♀. RTB-10503–507, 10511.

Mt Kinabalu, Paring, from bamboo and brown bat, 17–19.vii. 1953, R. Traub, 7 ♂ 14 ♀. RTB-19054, 19067, 19080.

Mt Kinabalu, Ranau, from bamboo bat, 21, 24.vii. 1953, R. Traub, Phang Ong Wah, 4 ♂ 6 ♀. RTB-19119, 19120, 20574.

MATERIAL IN THE COLLECTION

BORNEO

Sarawak, Tinjar, Fort Teju, 18.vi. 1950, 1 ♂ 1 ♀ paratypes.

Mt Kinabalu, Paring, 17.vii. 1953, 1 ♂ 1 ♀ paratypes.

***Basilias (Tripselia) coronata indivisa* n.subsp.**

(Fig. 530)

Specimens from Malaya differ constantly in some details of the female abdomen. Tergal plate 3 is undivided and bears 12 setae, the median 2 setae shorter than the others. The sides of the anal segment are bare except for 1–2 setae posteriorly near the setae of the anal processes.

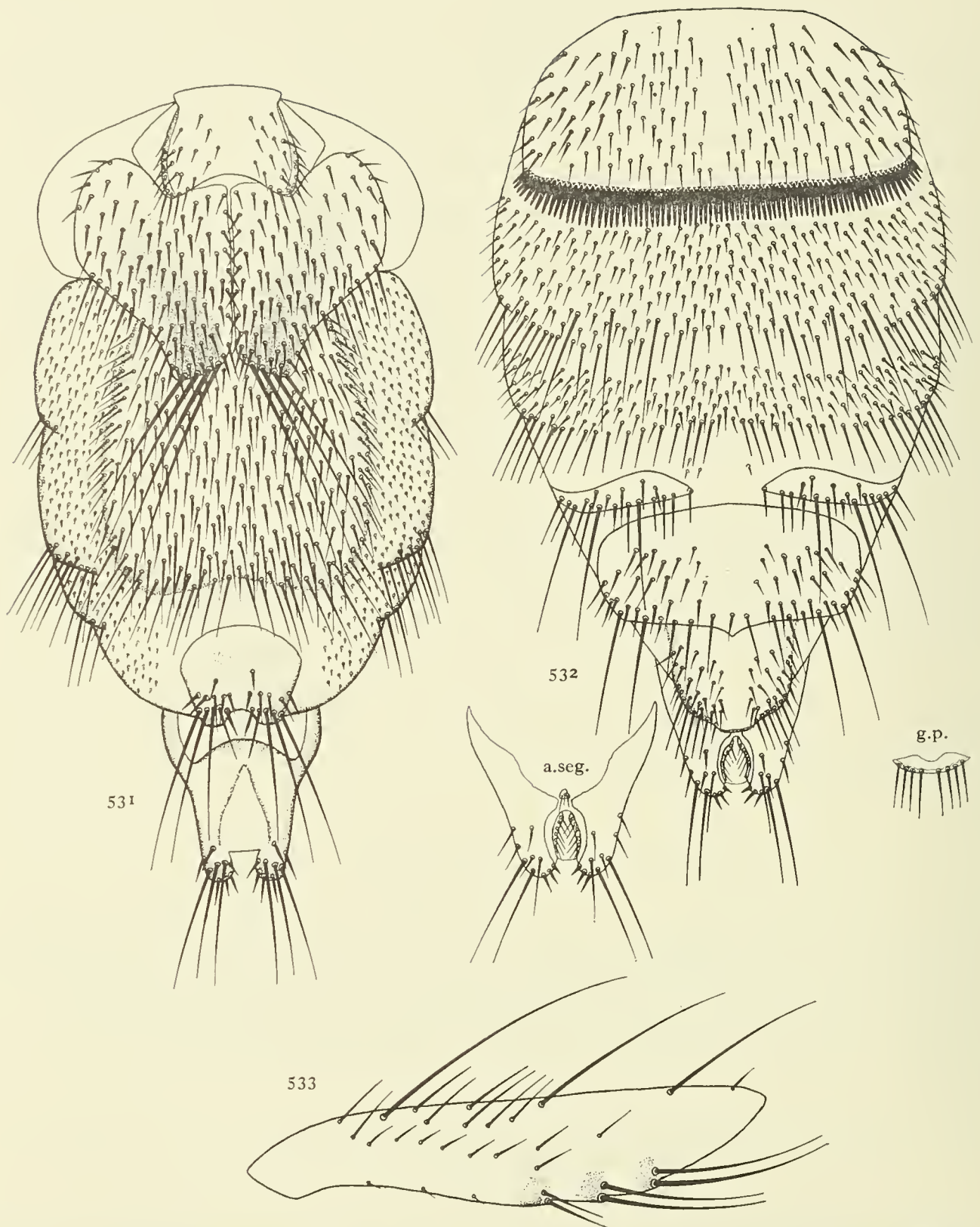
MALAYA. Selangor, Pahang Road, near Kuala Lumpur, from bats, 3.ix. 1948, R. Traub and B. Insoll, ♀ holotype, 2 ♂ 1 ♀ paratypes. RTB-8384, Chicago Natural History Museum.

***Basilias (Tripselia) echinata* (Theodor, 1957)**

(Figs. 531–533)

*Tripselia echinata*. Theodor, 1957, *Parasitology*, **47**, 457.

Length 3 mm. Colour brown. Head laterally compressed, the anterior dorsal margin forming an angle with 3 setae at each side near the apex and 2 further posteriorly. Labella of the proboscis very short, about one-third of the length of the theca.



Figs. 531-533. *Basilia (Tripselia) echinata* (Theodor). Female. 531. abdomen, dorsal; 532. same, ventral, with anal segment and genital plate; 533. tibia 3.



*Thorax.* Wider than long, length to width = 4:5. Angle of the oblique sutures 100°. 8–10 notopleural setae. Legs relatively short, tibiae 4 times as long as wide, with 3 rows of setae in the distal half of the ventral edge. The setae of the distal row reach beyond the end of the tibia.

*Female abdomen.* Tergite 1 with 4 spines at the lateral corners. Tergal plate 2 very short, wider than long, divided in the middle. Posterior processes round, with 3–4 long setae. A dense row of short setae along the lateral margins. The whole surface thickly covered with short spines which are longer posteriorly. Tergal plate 3 trapezoidal, with rounded posterior processes, which bear 3 long setae and short spines. Connexivum between tergal plate 2 and 3 covered with short setae anteriorly and longer setae posteriorly. Anal segment conical, with long anal processes, bare dorsally and laterally and with 4–5 setae and some spines at the anal processes. Pleurae covered with minute spines. Sternite 1 + 2 short, with a ctenidium of about 80 spines. Sternites 3 and 4 with marginal rows of longer setae laterally and shorter setae in the middle. Surface covered with short hairs. Sternite 5 with lateral narrow sclerites with 3 long setae laterally and shorter setae towards the middle and on the surface. Sternite 6 undivided, rectangular. Sternite 7 narrower, triangular, with rounded apex. A dense row of short setae at the posterior margin. Genital plate with 7 setae. Anal sclerite small, with 3 short setae.

Male unknown.

#### MATERIAL IN THE COLLECTION

##### SOUTHERN NIGERIA

Old Calabar, from *Eptesicus brunneus*, ♀ holotype.

#### HOST SYNONYMY

Name on original label	Current name
<i>Vesperugo brunneus</i> Thomas.	<i>Eptesicus brunneus</i> (Thomas).

### ***Basilia* (*Tripselia*) *falcozi* (Musgrave, 1925)**

(Figs. 534–537)

*Nycteribia falcozi*. Musgrave, 1925, *Rec. Austr. Mus.* **14**, 289.

*Nycteribia brevicauda*. Musgrave, 1925, *Rec. Austr. Mus.* **14**, 289.

*Nycteribia falcozi* Musgrave. Musgrave, 1927, *Rec. Austr. Mus.* **15**, 263.

*Nycteribia oceanica* Bigot. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

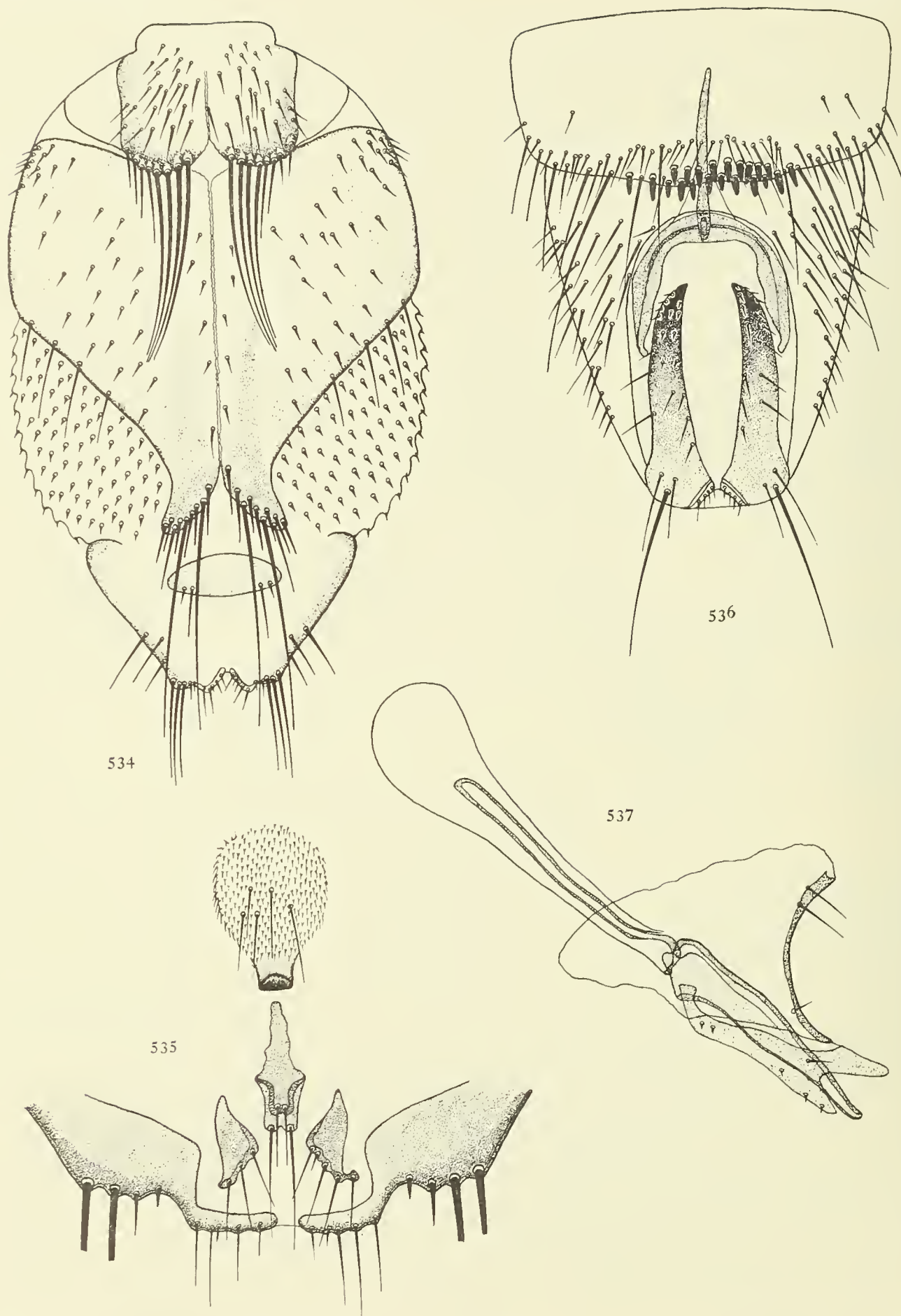
*Tripselia falcozi* (Musgrave). Theodor, 1956, *Parasitology*, **46**, 353.

Length 2.2–2.5 mm. Head with 6 setae at the anterior dorsal margin. Labella of the proboscis slightly shorter than the theca.

*Thorax.* As in *B. blainvillii*, slightly wider than long. Tibiae 5–6 times as long as wide, with 3 rows of setae in the middle, the setae of the distal row reaching the end of the tibia.

*Male abdomen.* The marginal rows of the tergites consist of longer setae alternating with short spines. Tergite 2 covered with short hairs on the surface. Tergite 3 with only one group in the middle. Tergites 4 and 5 with only single rows on the surface. Tergite 6 bare. Sternite 5 with a double row of short spines at the posterior margin, 12 more widely spaced spines in the posterior row and 9 more closely placed spines in the anterior row.

*Genitalia.* Claspers thick, slightly curved. Basal arc rounded, with a long anterior process.



Figs. 534-537. *Basilia (Tripselia) falcozi* (Musgrave). 534. female abdomen, dorsal; 535. female genital plate and anal sclerites; 536. male sternite 5 and genital area; 537. male genitalia.

Phallobase strongly concave dorsally, with 4 setae near the base and 2 further apically. Aedeagus straight, tapering to a blunt point. Parameres with a long apical end and a long ventral tooth.

*Female abdomen.* Tergite 1 with broad posterior lobes which bear 4–5 long setae and short setae laterally. Tergal plate 2 heart-shaped, with pointed posterior processes which bear 2 long setae and a row of 5–7 short spines. Pigmented stripes run from the processes into the lateral sclerites. Short setae in the lateral parts of the surface and along the midline. Tergal plate 3 transversely elliptical, with 2 longer and 2 shorter setae. Anal segment broadly conical, bare dorsally, with 2–3 short setae laterally and some longer setae posteriorly. Ventral surface as in *B. blainvillii*. Genital plate pear-shaped, with a double row of 5–6 setae in the middle.

Type series in the Australian Museum, Sydney.

## MATERIAL IN THE COLLECTION

## AUSTRALIA

Mt Lyndhurst near Farina, South Australia, from *Chalinolobus gouldii*, xii. 1919, E. Troughton, Australian Museum, Sydney, 1 ♂ 1 ♀ paratypes.

Parramatta, New South Wales, from *Chalinolobus morio*, iv. 1904, P. Schrader, N. C. Rothschild, 1 ♂ 1 ♀ (Brit. Mus. 1913.450).

Alexandria, Northern Territory, from *Chalinolobus gouldii*, W. Stalker, N. C. Rothschild, 1 ♂ 1 ♀ (Brit. Mus. 1913.450).

Dinner Creek, Ravenshoe, Queensland, from *Vespadelus pumilus*, 1922, Rothschild Coll., 1 ♂.

## HOST SYNONYMY

<i>Name on original label</i>	<i>Current name</i>
<i>Eptesicus pumilus</i> Gray.	<i>Vespadelus pumilus</i> Gray.

***Basilias (Tripselia) halei* (Musgrave, 1927)**

(Figs. 538–540)

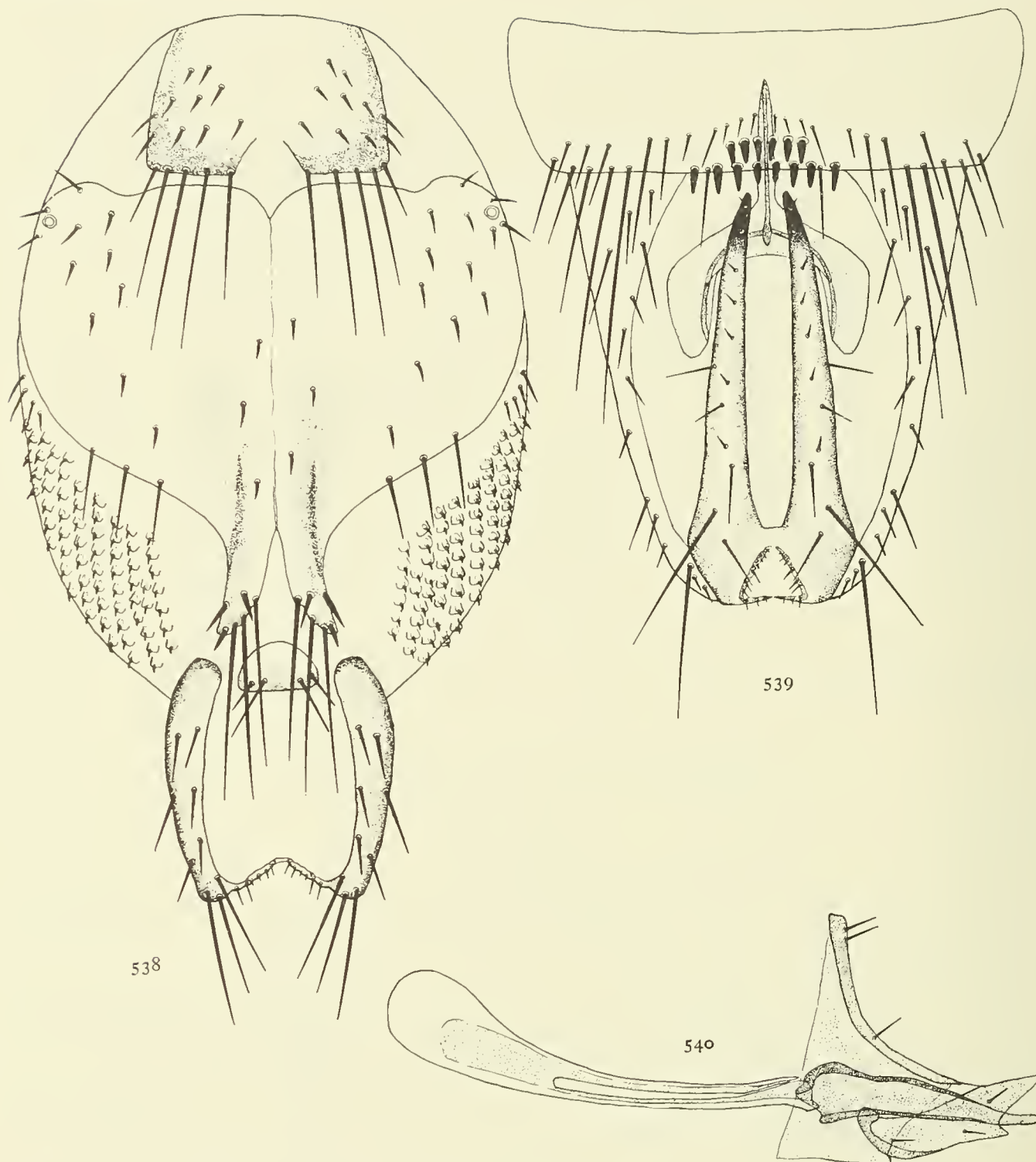
*Nycteribia halei*. Musgrave, 1927, *Rec. Austr. Mus.* **15**, 263.

Length 1.5 mm. Colour yellowish brown. Head with 6 short setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca. Palps with long terminal seta and very short setae at the edges.

*Thorax.* Slightly wider than long. Angle of oblique sutures 85°. 10 notopleural setae in the type series, 7–8 in specimens from North Australia. Tibiae 5 times as long as wide, with 3 rows of setae in the middle, those of the distal row just reaching the end of the tibia.

*Male abdomen.* Post-spiracular sclerite elliptical with 3 setae and 3–4 spines. Tergite 1 short with a marginal row of short setae with a gap in the middle. Tergites 2–4 with marginal rows of short setae alternating with short spines. Tergites 5 and 6 with longer marginal setae, particularly 2 in the middle. Tergite 2 with a double row of short hairs on the surface, the other tergites bare on the surface. Anal segment as long as the 3 preceding tergites, conical, with a double transverse row of short setae in the posterior part of the dorsal surface. Sternite 1 + 2 with a ctenidium of 45–50 spines (60 in the type). Sternites 3 and 4 with marginal rows of short setae and 1 or 2 long setae laterally. Sternite 3 with a few short hairs on the surface, sternite 4 bare. Sternite 5 longer, convex posteriorly, with a group of about 15 spines in 2 rows at the posterior margin. There are about 8 spines in the posterior row and 6 in the anterior row, long and





Figs. 538-540. *Basilia (Tripselia) halei* (Musgrave). 538. female abdomen, dorsal; 539. male sternite 5 and genital area; 540. male genitalia.

short setae laterally to the group of spines, and a few premarginal setae. Anal segment with a few setae laterally.

*Genitalia.* Claspers straight, thin, tapering to pigmented points. Basal arc rounded. Aedeagus straight, tapering to a point. Phallobase concave dorsally, with 2 setae near the base and 2 in the middle. Parameres with sharp apical end and a short ventral tooth.

*Female abdomen.* Tergite 1 with a marginal row of widely spaced setae, 4-5 at each side and with a gap in the middle. Lateral and posterior margin pigmented. Tergal plate 2 wide, heart-shaped, divided in the middle, with slender posterior processes which bear 1-3 long setae and 3-4 spines; a pigmented stripe runs from the processes into the middle of the lateral sclerites; a few scattered short setae on the surface; 3-4 short setae at the lateral margins. Tergal plate 3 small, rounded triangular, with 2-4 short setae posteriorly. Anal segment sclerotized laterally, membranous dorsally, with short setae laterally. Sternite 1 + 2 long, with a ctenidium of 45-50 spines, and about 4-5 rows of short setae on the surface. Sternites 3 and 4 with uniform marginal rows of short setae. 3-4 rows of short setae on the surface of sternite 3; sternite 4 bare. Sternite 5 with narrowly elliptical lateral sclerites with moderately long setae posteriorly and a long vertical seta laterally; these do not reach the midline and there are 4 setae between them. Sternite 6 with larger triangular sclerites with a similar arrangement of setae, fused with sternite 7 which is rounded posteriorly and bears long setae at the sides of the posterior margin, and shorter setae in the middle; 1-2 rows of short vertical setae on the surface. Genital plate with 4-5 short setae on an area of minute spines. Anal sclerite parallel-sided, with 2 or 4 setae, connected by a narrow strip with the genital plate. Adanal plates with 3 setae.

Distribution and host: South Australia, Arkaba, from *Chalinolobus morio*.

Type series in the Australian Museum, Sydney.

#### MATERIAL IN THE COLLECTION

##### NORTH AUSTRALIA

From *Nyctophilus walkeri*, 2 ♂ 2 ♀ (Brit. Mus. 1911.103).

#### ***Basilia (Tripselia) hirsuta* (Theodor, 1956)**

(Figs. 541-547)

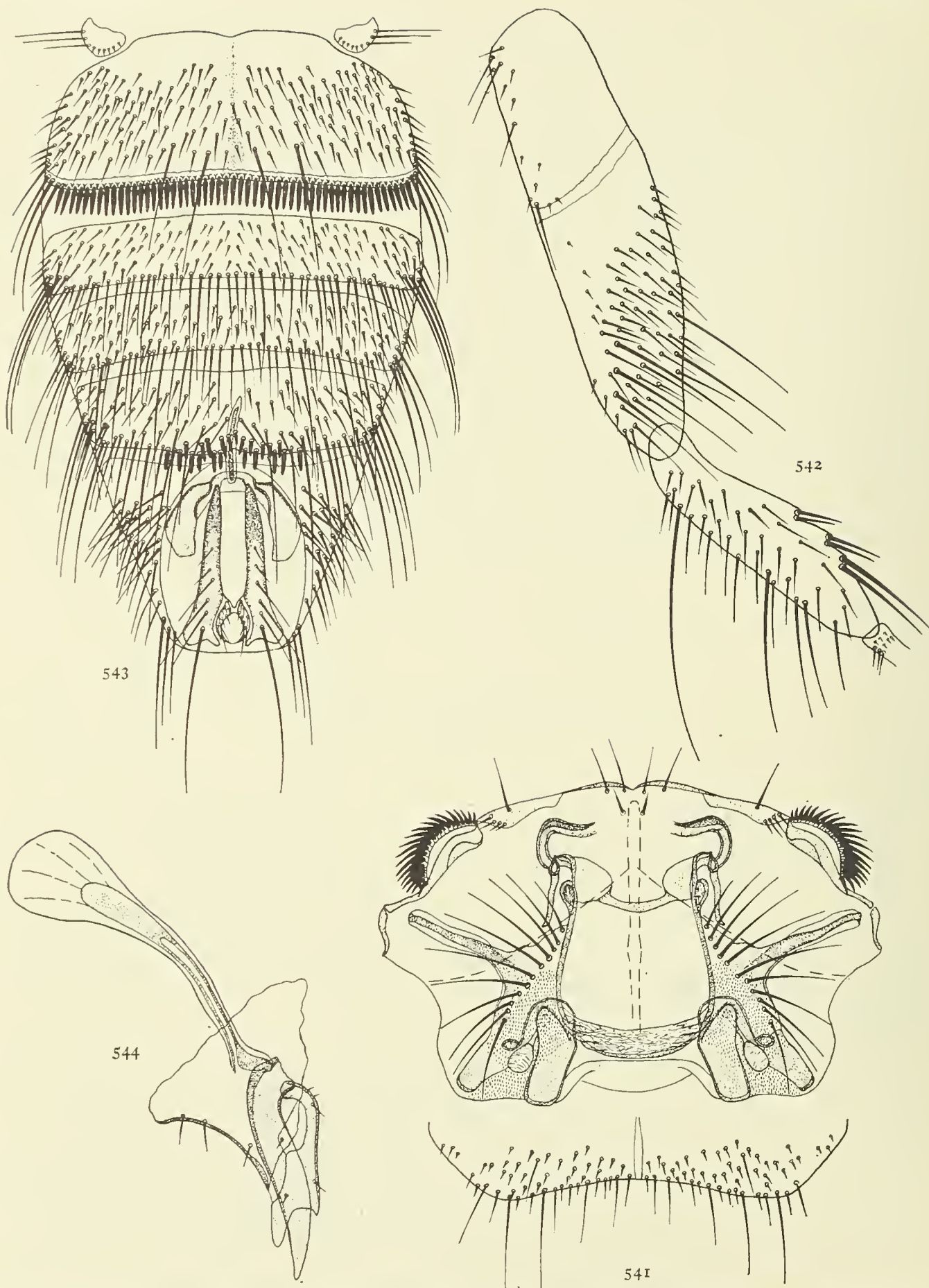
*Tripselia hirsuta*. Theodor, 1956, *Parasitology*, **46**, 353

Length 2.5 mm. Colour brown.

*Head.* Anterior dorsal margin forming an angle with 5-6 setae at each side. 8-10 setae on the genae. Labella of the proboscis as long as the theca or slightly shorter.

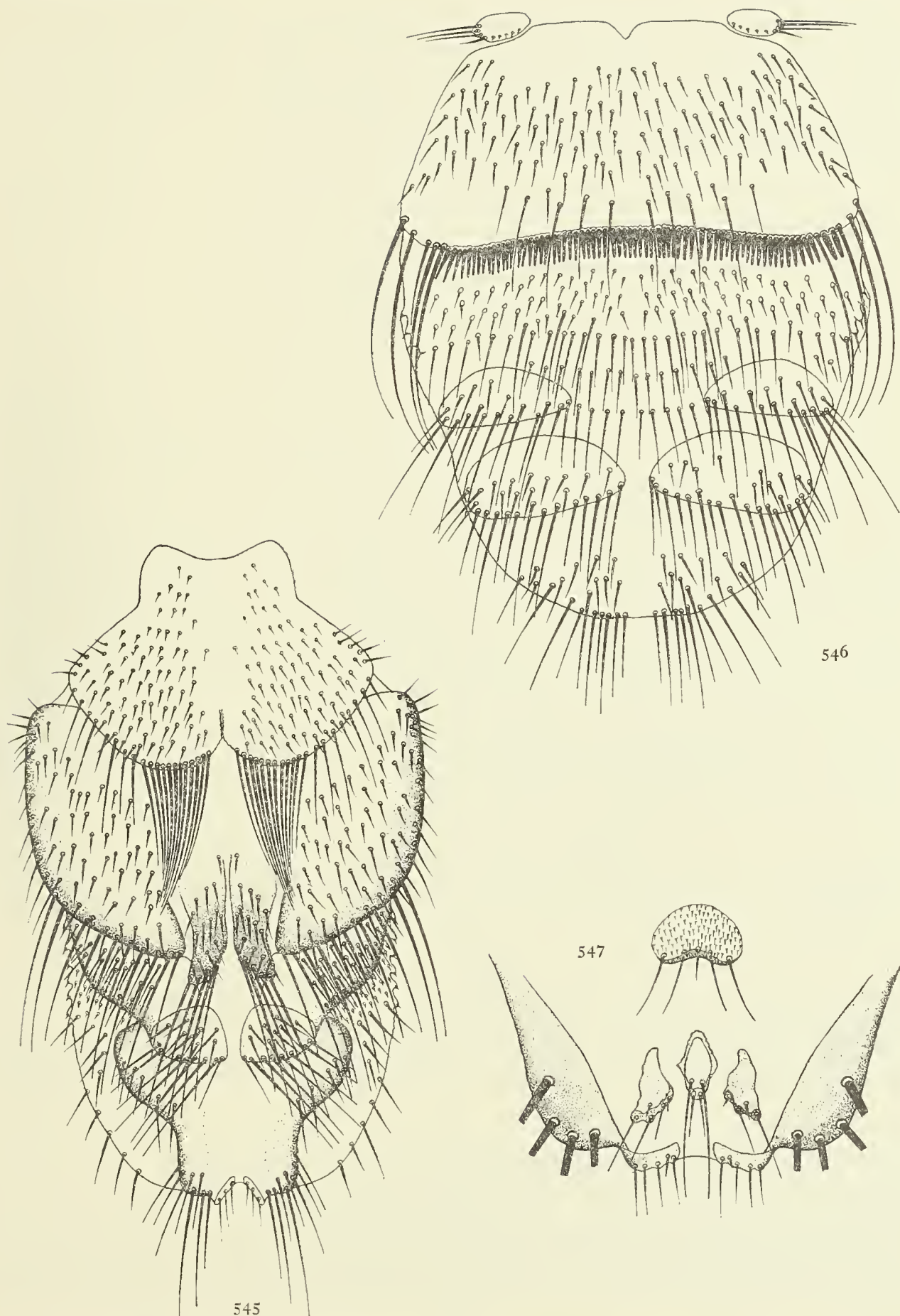
*Thorax.* Much wider than long. Length to width = 2:3.5. Angle of oblique sutures about 100°. Posterior margin of the sternal plate with a row of 8 long and several shorter setae. Mesonotum wide, rounded posteriorly. Lateral plates of the notopleural sutures wide, with a row of about 12 notopleural setae which reach to near the anterior spiracle. Tibiae 4 times as long as wide, with 3 rows of setae in the distal half of the ventral edge.

*Male abdomen.* Tergites 2-6 with marginal rows of moderately long setae posteriorly and 4-6 very long and thick setae in the marginal rows of tergites 4-6. The surface of tergites 2-5 is thickly covered with short setae which are longer than in related species. Only 1-2 rows on tergite 6. Anal segment broadly conical, covered with short setae on the posterior two-thirds of the dorsal surface and with long setae posteriorly. Sternite 1 + 2 short, with a ctenidium of about 60 spines and 1-3 long curved setae at the posterior lateral corners. These setae are shorter than in the female. Sternite 5 with a group of about 24 spines in 2 rows, those of the posterior row longer and more widely spaced.



Figs. 541-544. *Basilia (Tripselia) hirsuta* (Theodor). 541. thorax, dorsal, and postero-ventral margin; 542. hind leg, anterior surface; 543. male abdomen, ventral; 544. male genitalia.





Figs. 545-547. *Basilia (Tripselia) hirsuta* (Theodor). Female. 545. abdomen, dorsal; 546. same, ventral; 547. genital plate and anal sclerites.

*Genitalia.* Claspers rather short, slightly curved, pigmented in the apical half. Basal arc broad, with wide lateral flaps and long anterior process. Phallobase slightly concave dorsally, with 4 setae near the base and 3 further apically. Aedeagus slightly curved, wide in the basal two-thirds and then tapering to a blunt tip. Apodeme short, with a wide end-plate. Parameres with a long apical end and a sharp, short, ventral tooth.

*Female abdomen.* Tergite 1 with 2 large rounded lobes posteriorly, each of which bears a dense row of about 15 long setae; a gap in the middle between the rows; shorter setae laterally at the posterior margin; the surface is covered with short setae which leave a median strip bare. Tergal plate 2 divided into 4 longitudinal, sclerotized strips. The median strips are narrow and pigmented and bear 4–6 long setae at the posterior processes and a dense group of short setae anterior to them, leaving a bare space beneath the long setae of tergite 1. The lateral sclerotized areas are wide, densely covered with short setae, and have a row of about 12 long setae at the posterior margin. Tergal plate 3 divided into rounded lateral sclerites, covered with short setae and with longer setae posteriorly. A dense group of long setae on the connexivum behind the lateral plates of tergal plate 2. Pleurae with minute spines anteriorly and bare posteriorly. An oblique row of setae between spiracles 6 and 7. Anal segment narrow posteriorly, with 2 wide lateral bulges anteriorly, bare dorsally. A few setae at the anterior lateral bulges and some longer and shorter setae posteriorly. Sternite 1 + 2 wide, longer than in the male, with a ctenidium of about 70 spines and 3–5 very long, curved setae at the sides of the ctenidium in the lateral posterior corners of the sternite. The surface of the sternite is covered with short setae except for an anterior and a posterior bare strip. Behind the area of short setae a row of 8–10 long setae. Sternite 5 with triangular lateral sclerites which have 8–10 setae between them. Sternite 6 similar, but the lateral sclerites are larger and reach close to the midline. Sternite 7 very wide, rounded posteriorly. Anal sclerite small, rhomboidal or elliptical, with 2 longer and 2 shorter setae posteriorly. Adanal plates triangular, with 3–4 setae. Genital plate transversely elliptical, with 4–6 longer setae and minute spines.

## MATERIAL IN THE COLLECTION

## NEW GUINEA

Kamali, near Port Moresby, from *Nycticeius greyi*, Genoa Museum, N. C. Rothschild, ♀ holotype, 2 ♂ 3 ♀ paratypes (Brit. Mus. 1913.450).

Kamali, from *Pipistrellus* sp., Genoa Museum, N. C. Rothschild, 2 ♂ 4 ♀ paratypes (Brit. Mus. 1913.450).

## HOST SYNONYMY

Name on original label	Current name
<i>Scotophilus greyi</i> Gray.	<i>Nycticeius greyi</i> Gray.
<i>Pipistrellus abramus</i> Temminck.	<i>P. abramus</i> does not occur in New Guinea, and the host will therefore probably prove another species of this genus.

***Basilias (Tripselia) horrida* (Schuermans Stekhoven, 1958)**

*Tripselia horrida.* Schuermans Stekhoven, 1958, *Zeitschr. f. Parasitenk.* **18**, 386.

This species is closely related to *Basilias hirsuta* and the differences are mainly in the shape of tergite 1 of the female, which is more triangular than in *B. hirsuta*, has only 6–8 long setae



posteriorly and is nearly completely covered with short setae, while in *B. hirsuta* there is a bare median strip. In the male, the row of premarginal setae on sternite 1 + 2 and the setae at the sides of the ctenidium are absent and there are no long setae in the lateral parts of the surface of sternites 3–5. It is not certain that these differences are of specific significance, and more material will have to be examined and the genitalia described before the status of the species can be determined.

Distribution and host: New Guinea, from *Pipistrellus papuanus*.

***Basilias (Tripselia) longispinosa* (Musgrave, 1927)**

(Figs. 548–550)

*Nycteribia longispinosa*. Musgrave, 1927, *Rec. Austr. Mus.* **15**, 263.

Length 2.5–2.7 mm. Colour brown. Head with 6–8 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax*. Wider than long. Length to width = 3 : 4. Angle of oblique sutures 95°. 13–16 notopleural setae. Mesonotum wide, rounded posteriorly. Tibiae 5 times as long as wide, tapering gradually with 3 rows of long setae in the middle of the ventral edge.

*Male abdomen*. Post-spiracular sclerite with 3–4 long setae near the spiracle and 3–4 spines. Tergite 1 with a marginal row of short setae with a gap in the middle. Tergites 2–4 with marginal rows of longer and shorter setae. Tergites 5 and 6 with marginal rows of slightly longer and stronger setae, particularly 2–4 in the middle of the row. Tergites 2–5 covered with short hairs. Tergite 6 bare except for a few short scattered setae. Anal segment conical, with short setae dorsally in the posterior two-thirds and 2 long setae at the posterior corners. Sternite 1 + 2 with a ctenidium of 56–60 spines. Sternites 3 and 4 with marginal rows of longer setae lateral and shorter setae in the middle. 2–3 rows of short hairs on the surface of sternite 3, sternite 4 with only a few hairs laterally. Sternite 5 longer, with a group of spines in 2 rows at the posterior margin; 12–14 longer and more widely spaced spines in the posterior row, and 12–13 shorter and more closely placed spines in the anterior row. The anterior row is much shorter and is placed opposite the 6–7 median spines of the posterior row. Long and shorter setae lateral to the group of spines and a pre-marginal row of short setae. Anal segment thickly covered with setae at the sides of the ventral surface.

*Genitalia*. Claspers with dark tips, with a long seta dorsally near the base and shorter setae up to the middle. Basal arc broadly rounded and with a long anterior process. Aedeagus straight, tapering to a sharp point. Apodeme with a narrow end-plate. Parameres with a long, triangular apical end and obtuse ventral angle. Phallobase concave dorsally, with 4 setae near the base and 2 near the apex.

*Female abdomen*. Tergite 1 large, with two rounded posterior lobes, each with 7–9 very long, closely placed setae; a deep incision between the two lobes. The long setae are not much longer than in specimens of *B. falcozi* examined, but more numerous. A darkly pigmented stripe along the posterior margin of the tergite. Surface covered with short setae except in the posterior part. Tergal plate 2 long, heart-shaped, with posterior processes which bear 4–6 very long setae and a single row of 5–7 long spines. Short setae at the sides of the surface and along the



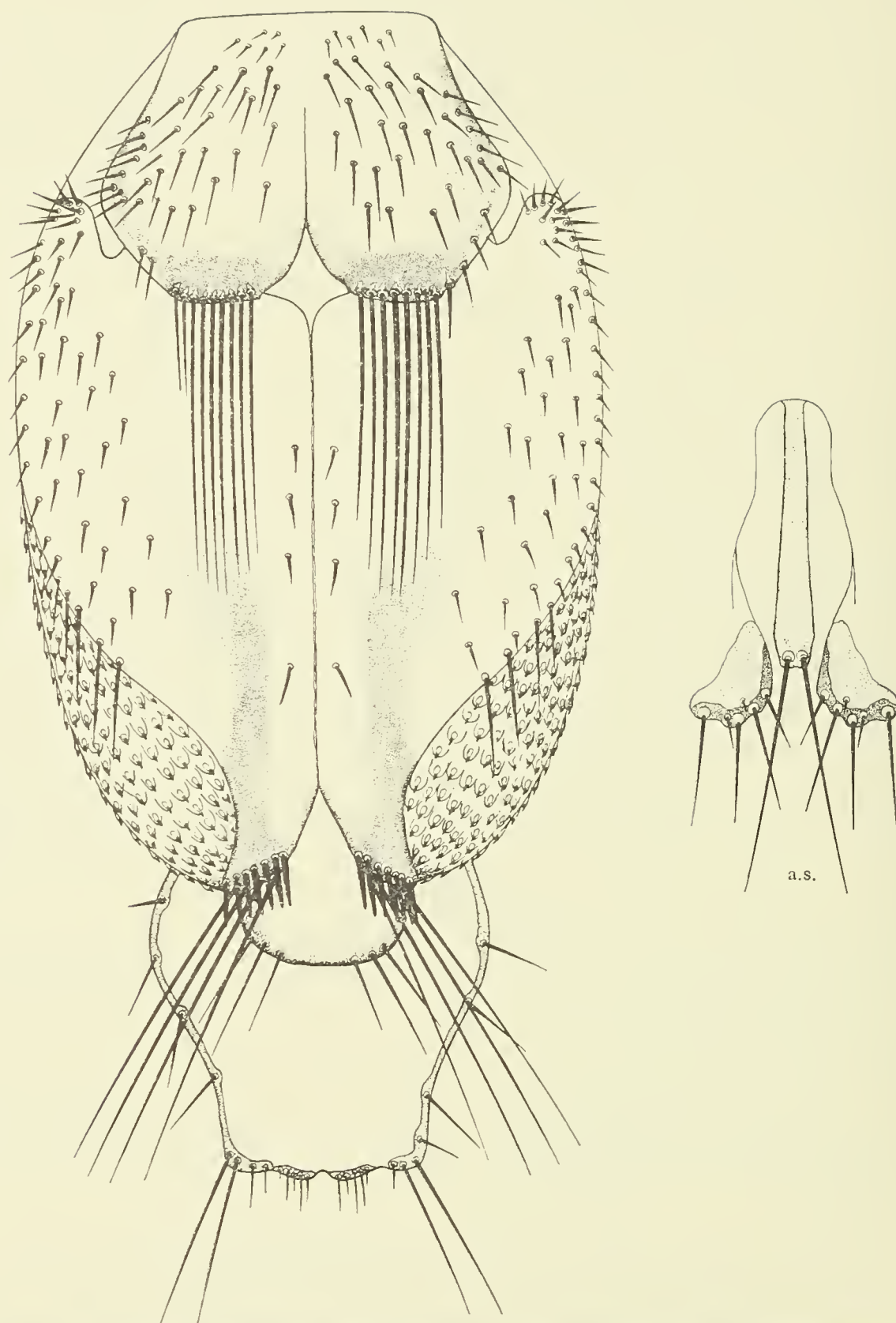
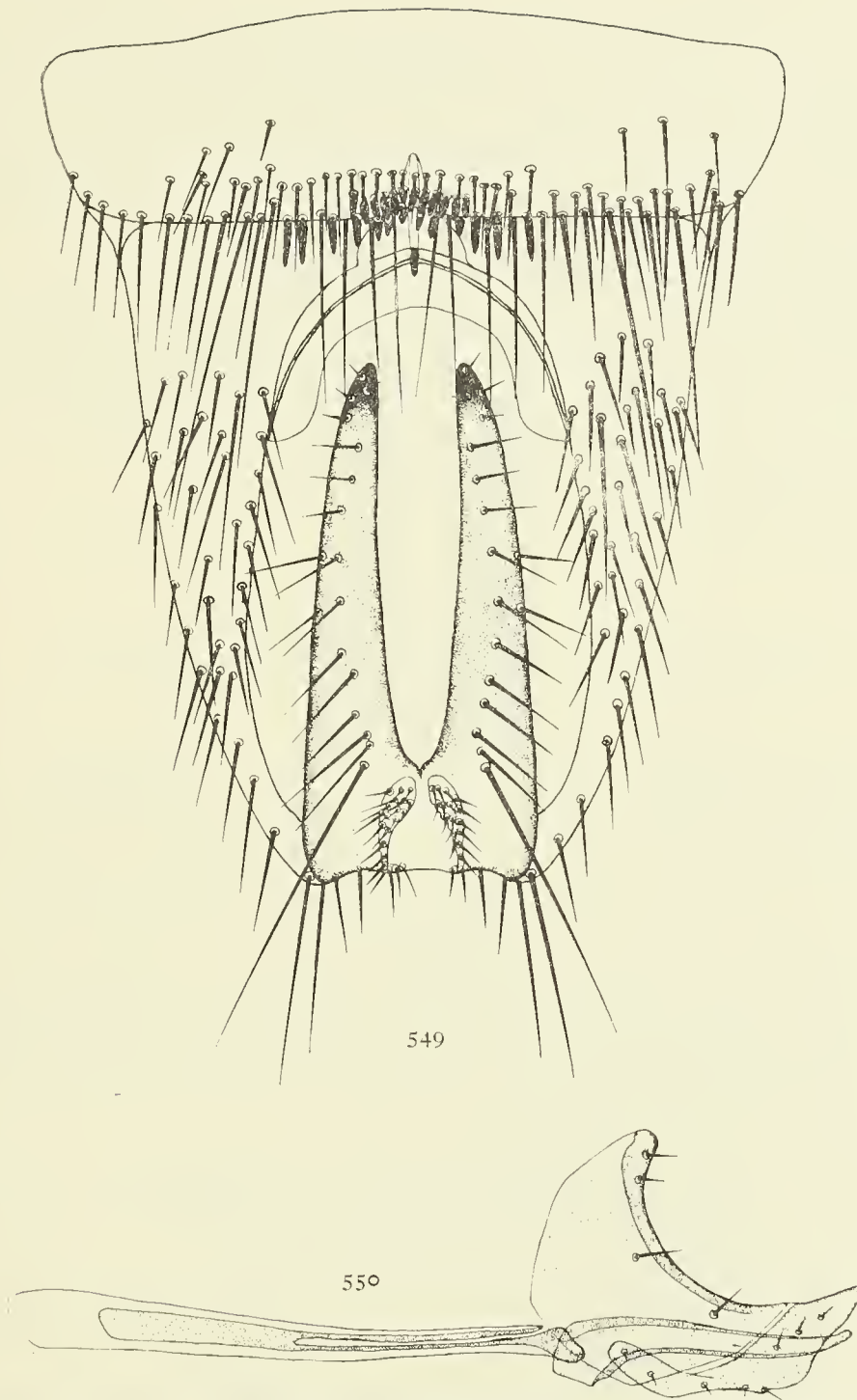


Fig. 548. *Basilia (Tripselia) longispinosa* (Musgrave). Female abdomen, dorsal, with anal sclerites.



Figs. 549, 550. *Basilia (Tripselia) longispinosa* (Musgrave). Male. 549. sternite 5 and genital area; 550. genitalia.

median line. Pigmented stripes run from the posterior processes into the middle of the lateral halves. 4 setae at the oblique lateral margins. Tergal plate 3 elliptical with 2 groups of 3 setae at the sides of the posterior margin. Anal segment conical, bare dorsally, with 3 setae at the anterior lateral bulge and a few further posteriorly. Two long setae at the posterior lateral corners. Sternite 1 + 2 large, with a ctenidium of 66-70 spines, surface covered with short setae. Sternites 3 and 4 with marginal rows of moderately long setae, sternite 3 covered with

short setae, sternite 4 bare on the surface. Sternite 5 with narrow lateral sclerites and 6-7 setae between them. They have a marginal row of longer setae and short setae on the surface. Sternite 6 with larger, elliptical sclerites which reach the midline and are partly fused with sternite 7. They have similar marginal rows as sternite 5 and several rows of short setae on the surface. Sternite 7 broadly rounded posteriorly, with a dense marginal row of long setae, a premarginal row of 4 long, vertical setae and 1-2 rows of short setae further anteriorly. The genital plate consists of an area of minute spines without any longer setae in the paratype examined. Anal sclerite very long and narrow, with 2 setae posteriorly. Adanal plates broad, with 4 setae.

Distribution and host: New South Wales, Sans Souci, Botany Bay, from *Scoteinus rueppellii*.

The male paratype examined proved to be *B. trougtoni*. A specimen from the collection of the British Museum agrees in all details with the description given by Musgrave and the above description of the male is based on this specimen.

Type series in the Australian Museum, Sydney.

MATERIAL IN THE COLLECTION

AUSTRALIA

Richmond River, New South Wales, from *Nycticeius rueppellii*, 1 ♂ (Brit. Mus. 1911.103).

HOST SYNONYMY

Name on original label	Current name
<i>Scoteinus rueppellii</i> Peters.	<i>Nycticeius rueppellii</i> Peters.

***Basilias (Tripselia) major* n.sp.**

(Fig. 551)

A male and a female from North Borneo resemble *B. coronata* n.sp. in general but differ in a number of characters which are given below. Their host and distribution are not known and it is possible that they will prove a subspecies of *B. coronata*.

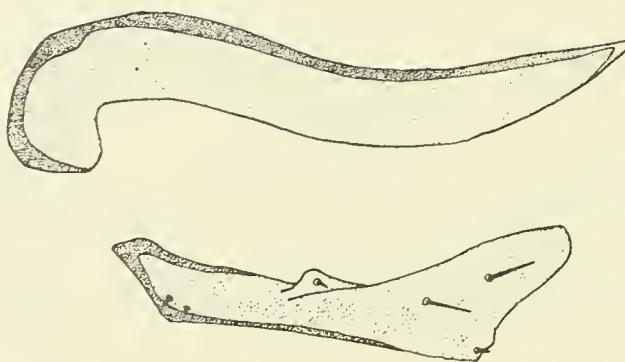


Fig. 551. *Basilias (Tripselia) major* n.sp. Male aedeagus and paramere.

Length 2 mm., more heavily sclerotized and darker brown than *B. coronata*.

*Male abdomen.* The short setae on the surface of the abdominal tergites of the male are more numerous than in *B. coronata*. Sternite 5 is relatively shorter and has a straight posterior margin. The group of spines consists of 12 widely spaced spines in the posterior row, the lateral spines



longer than the median ones. The anterior row consists of 10 closely placed shorter spines opposite the 6 median spines of the posterior row.

*Genitalia.* Aedeagus much longer and slenderer than in *B. coronata*, nearly 9 times as long as wide in the middle and forming a shallow S-curve. Parameres also much longer, with a blunt apical end and a ventral angle which bears a minute hair.

*Female abdomen.* There are 7–8 long setae on the posterior processes of tergite 1. The posterior processes of tergal plate 2 are broader than in *B. coronata* and bear 4–5 long setae. Tergal plate 3 undivided, with 12 longer and shorter setae. Anal segment covered with setae along its whole sides, nearly up to the anterior margin. The setae on the surface of sternite 7 are more numerous than in *B. coronata* and are arranged in 3 rows.

## MATERIAL IN THE COLLECTION

## NORTH BORNEO

Kidukarok, from Vespertilionid bat, 9.ix. 1956, ♂ holotype, ♀ paratype, C.B.-3435. Cambridge North Borneo Expedition.

***Basilia (Tripselia) multispinosa* (Musgrave, 1927)**

(Figs. 552–554)

*Nycteribia multispinosa.* Musgrave, 1927, *Rec. Austr. Mus.* **15**, 263.

Length 3 mm. Colour brown, body strongly sclerotized. Head long, sclerotized up to the anterior margin, with a row of about 6–8 setae at the margin which is double in the middle. Labella of the proboscis slightly shorter than the theca.

*Thorax.* Markedly wider than long. Length to width = 2 : 3. Median suture of the sternal plate well marked, widened in the middle. Angle of oblique sutures 100°. Marginal posterior row of the sternal plate with 4 long setae and several shorter setae in each half. 4 longer vertical setae on the area posterior to the oblique sutures and 2 at their lateral ends. Mesonotum parallel-sided, rounded posteriorly, lateral plates of the notopleural sutures wide. 14–18 notopleural setae in a dense row. Tibiae 6 times as long as wide, tapering gradually, with 3 rows of setae near the middle, the distal row just reaching the end of the tibia.

*Male abdomen.* Post-spiracular sclerite curved, with 5 setae and 3–4 spines. Tergites 1–6 with dense marginal rows of longer and shorter setae. The setae are longer on the posterior tergites, particularly 2 in the middle of the marginal row of tergite 6. Surface of tergites 1–5 covered with short hairs, except in the anterior lateral corners of tergites 3–5. Tergite 6 bare. Anal segment conical, with short setae on the posterior part of the dorsal surface and some long setae posteriorly. Sternite 1 + 2 with a ctenidium of 60 spines and 3–4 rows of short setae on the surface. Sternites 3 and 4 with marginal rows of long setae. Surface of sternite 3 covered with short hairs, only 1–2 such rows on sternite 4. Sternite 5 longer, with a group of 22 spines in 2 rows at the posterior margin. 13 longer and more widely spaced spines in the posterior row and 9 closely placed shorter spines in the anterior row. Long setae at the sides of the hind margin and a premarginal row of shorter setae. Anal segment with setae at the sides of the ventral surface.

*Genitalia.* Basal arc broad, rounded, with a long anterior process. Claspers pigmented,

straight, with a long seta dorsally near the base and shorter setae to half the length of the clasper. Aedeagus straight, tapering to a blunt point. Parameres with a blunt apical end and a large ventral tooth.

*Female abdomen.* Tergite 1 with 2 groups of 7-8 long, closely placed setae and a deep con-

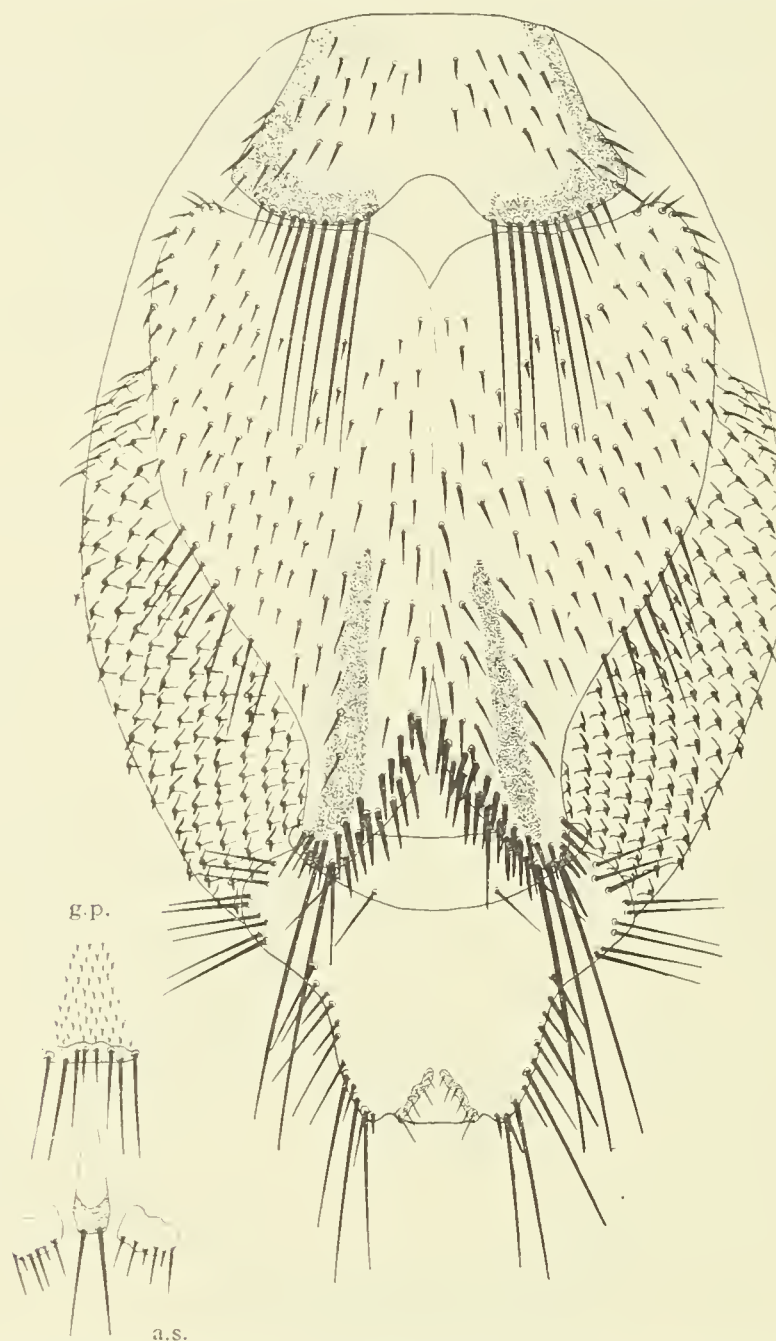
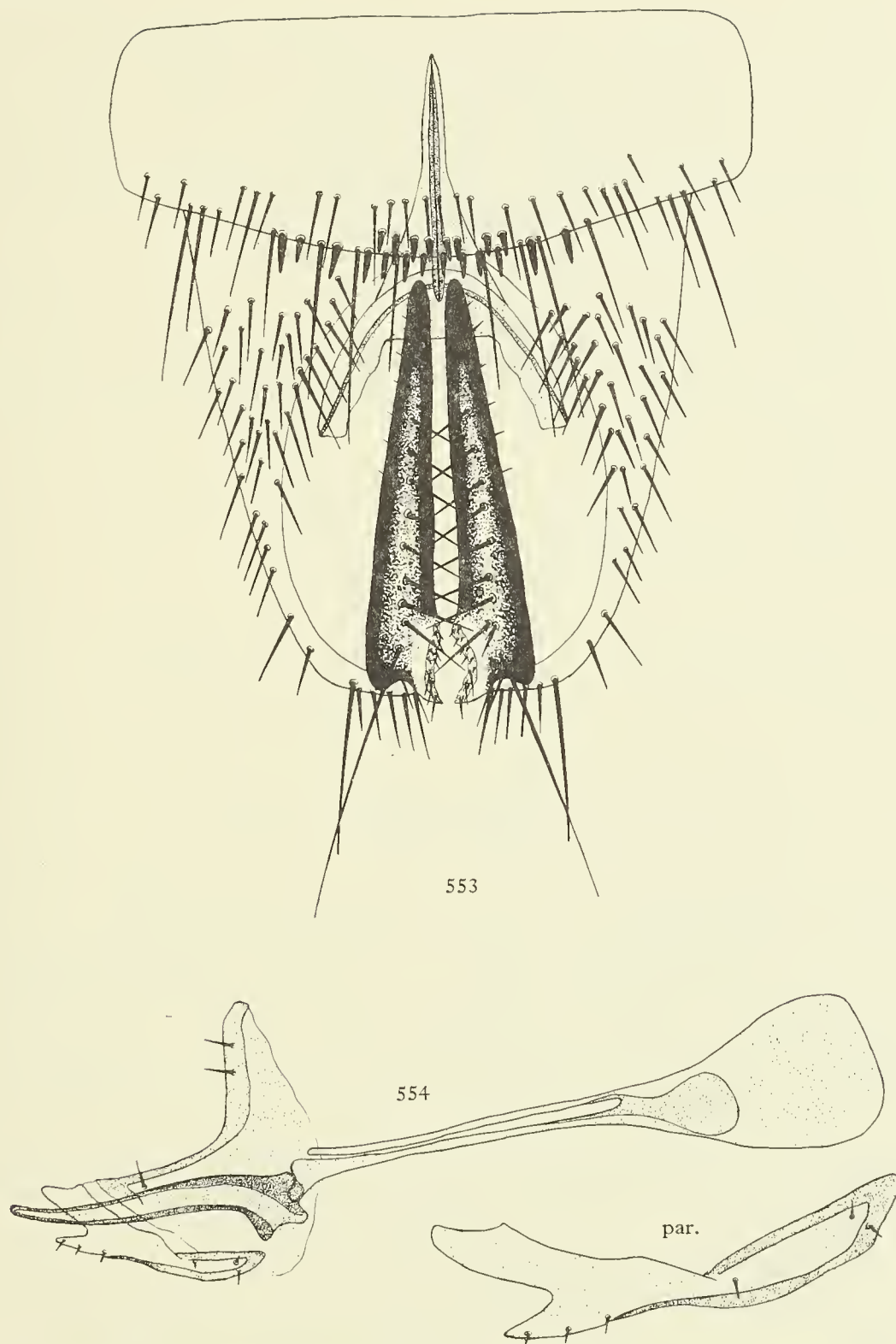


Fig. 552. *Basilia (Tripselia) multispinosa* (Musgrave). Female abdomen, dorsal, with genital plate and anal sclerites.

cavity between the two groups. Surface covered with short spines in the anterior two-thirds. Lateral and posterior border of the sclerite in front of the marginal setae deeply pigmented. Tergal plate 2 large, heart-shaped, divided in the middle, with 2 broad posterior processes which bear 2-7 long setae and several rows of long spines. 7-8 setae at the lateral margins. Surface densely covered with short setae. Pigmented stripes extend from the posterior processes into the



Figs. 553, 554. *Basilia (Tripselia) multispinosa* (Musgrave). Male. 553. sternite 5 and genital area; 554. genitalia and paramere.

lateral halves of the tergal plate. Tergal plate 3 transversely elliptical with 2-4 short setae. Anal segment very wide at the base, with lateral bulges anteriorly which are covered with setae. Short setae at the posterior part of the sides and a few longer setae posteriorly. Dorsal surface of the anal segment membranous and bare. Sternite 1 + 2 with a ctenidium of 60-66 long



spines. Surface covered with short setae. Sternites 3 and 4 with marginal rows of moderately long setae. The surface of sternite 3 is covered with short setae and there is a row of 4 long pre-marginal setae. Sternite 4 much shorter, with bare surface. Sternite 5 with narrow lateral sclerites which do not reach the midline; 8 setae between the sclerites. They have marginal rows of moderately long setae in the middle, longer setae laterally and a row of short setae on the surface. Sternites 6 and 7 fused, but their limits are distinguishable by the rows of setae. Marginal rows of the sclerites of sternite 6 as in sternite 5, but they have 3-4 rows of short setae on the surface; the sclerites reach the midline. Sternite 7 large, trapezoidal, with a double row of setae at the posterior margin and 2-3 rows of shorter setae on the posterior lateral part of the surface. Genital plate triangular, with 8 setae posteriorly. Anal sclerite joined with the genital plate by a narrow sclerotized strip, with 2 setae. Adanal plates small, with 3-4 longer setae and a few short spines.

Distribution and host: Australia, New South Wales, Berrima, Barrington River, from *Nycticeius rueppellii*.

Type series in the Australian Museum, Sydney.

HOST SYNONYMY

Name on original label  
*Scoteinus rueppellii* Peters.

Current name  
*Nycticeius rueppellii* Peters.

***Basilias (Tripselia) musgravei* n.sp.**

(Fig. 555)

Length 2.3 mm. Colour brown. Head with 4 setae at the anterior dorsal margin. Labella of the proboscis shorter than the theca.

*Thorax.* Wider than long, length to width = 2 : 3. Angle of oblique sutures 100°. 12-13 notopleural setae. Tibiae 5-5.5 times as long as wide. 3 rows of setae at the distal part of the ventral margin.

*Female abdomen.* Post-spiracular sclerite curved, with 2 setae and short spines. Tergite 1 with 2 widely separated groups of short setae, the median seta of each group the longest; a few small spines on the lateral parts of the surface. Tergal plate 2 large, heart-shaped, divided in the middle, with broad posterior processes, each bearing 3-4 long setae and a row of 6-8 long spines; surface with short spines in the middle; 4-5 setae at the lateral margins. Tergal plate 3 divided into two small, rounded lobes, each bearing 4 short setae directed posteriorly. Anal segment short, conical, with 3 long setae at the posterior processes, bare otherwise. Sternite 1 + 2 with a ctenidium of 56 long spines. Sternites 3 and 4 with marginal rows of short setae and with short hairs on the surface of sternite 3. Sternite 4 bare except for a few hairs laterally. Sternite 5 with narrow lateral sclerites and 5 setae between them. Sternite 6 with larger sclerites, with uniformly long setae posteriorly and a row of short setae on the surface. Sternite 7 rounded posteriorly, with a row of 10 setae which are shorter in the middle; several rows of setae of varying length on the posterior part of the surface. Genital plate with 4 setae on an area of minute spines. Anal sclerite with 2 setae. Adanal plates with 3 setae posteriorly.

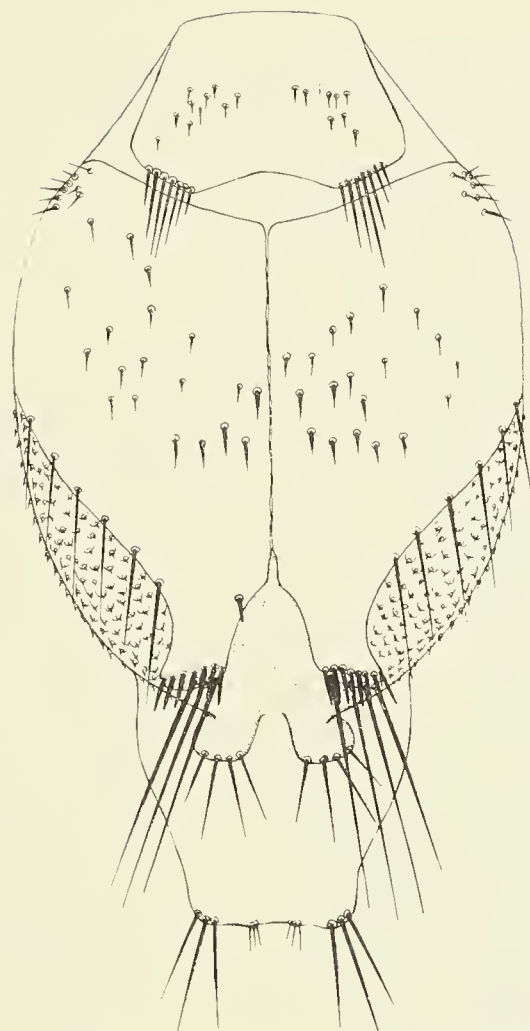


Fig. 555. *Basilia (Tripselia) musgravei* n.sp. Female abdomen, dorsal.

Male unknown.

The species is related to *B. trougtoni* and *B. burrelli*, as it has a divided tergal plate 3, but differs from them in the chaetotaxy of this sclerite and in the presence of short setae on tergite 1 from *B. trougtoni*.

#### MATERIAL IN THE COLLECTION

##### AUSTRALIA

North Queensland, Inkerman, from *Vespadelus pumilus*, W. Tregan, J. Forrest, W. Stalker, N. C. Rothschild, ♀ holotype (Brit. Mus. 1913.450).

#### HOST SYNONYMY

Name on original label	Current name
<i>Vespertilio pumilus</i> Gray.	<i>Vespadelus pumilus</i> Gray.

### ***Basilia (Tripselia) peselefantis* (Schuurmans Stekhoven, 1942)**

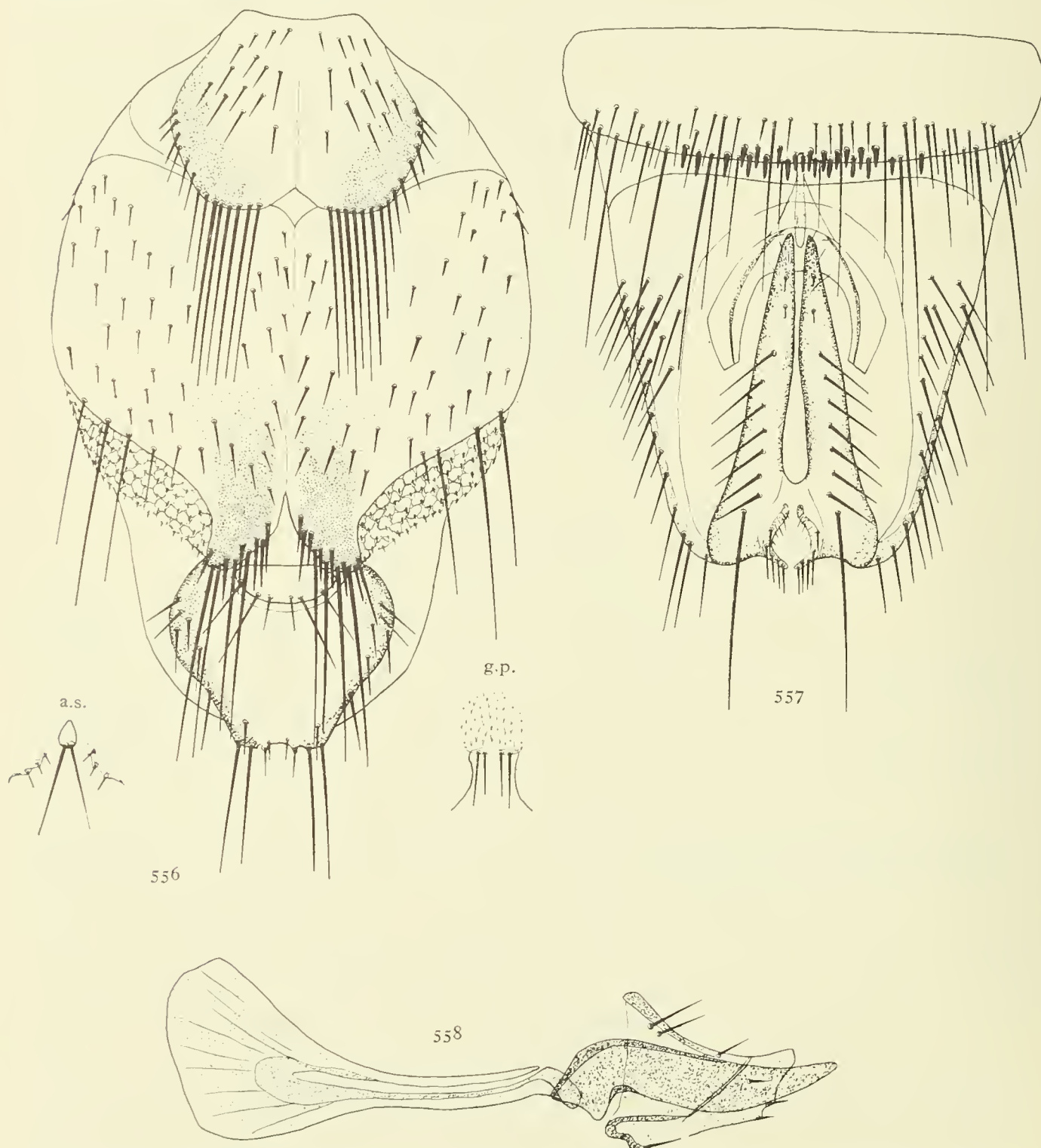
(Figs. 556-558)

*Penicillidia peselefantis*. Schuurmans Stekhoven, 1942, *Zeitschr. Parasitenk.* **12**, 507.

Length 1.75-2 mm. Colour brown. Head long, with 6 setae at the anterior dorsal margin. 2 rows of setae on the genae. Labella of the proboscis shorter than the theca.

*Thorax*. Wider than long. Length to width = 4:5. Angle of oblique sutures 90°. Posterior

margin of the sternal plate with a row of short setae and 3 long setae in each half. 2 vertical longer setae in the posterior part of the sternal plate and at the lateral ends of the oblique sutures. 11-12 notopleural setae. Tibiae slender, 4.5 times as long as wide, tapering gradually, with 3 rows of setae in the middle of the ventral edge, the setae of the distal row very long, those of the middle and proximal row short.



Figs. 556-558. *Basilia (Tripselia) peselefantis* (Schuurmans Stekhoven). 556. female abdomen, dorsal, with genital plate and anal sclerites; 557. male sternite 5 and genital area; 558. male genitalia.



*Male abdomen.* Post-spiracular sclerite broad, triangular, with 2 long setae and 4–5 spines. Tergite 1 with a marginal row of short setae with a gap in the middle. Tergites 2 and 3 with marginal rows of longer and shorter setae. Tergites 4–6 with marginal rows of still longer setae, particularly those in the middle of the rows of tergites 5 and 6. Surface of tergites 2–5 covered with short hairs. They are less numerous on tergite 5. Tergite 6 bare. Anal segment conical, with short setae in the posterior half of the dorsal surface. Sternite 1 + 2 with a ctenidium of 56 spines and 3 rows of short setae on the surface. Sternites 3 and 4 short, with marginal rows of moderately long and short setae and short setae on the surface. Sternite 5 not longer than 4, with a group of about 25 spines in 2 rows at the posterior margin, those of the posterior row longer and the median spines shorter than the lateral ones.

*Genitalia.* Claspers thin, slightly curved, dark, with a long seta dorsally near the base and shorter setae up to the apical third. Basal arc rounded, with a long anterior process. Aedeagus short, wide, 0.2 mm. long, strongly curved near the base, tapering to a sharp point. Apodeme with a very wide end-plate. Parameres with short, rounded apical end and obtuse ventral angle. Phallobase with 4 setae near the base and 2 in the middle.

*Female abdomen.* Tergite 1 rounded, with 2 rounded lobes posteriorly and an incision in the middle of the posterior margin; each lobe bears a group of 7–8 closely placed, long setae and 3–4 short setae laterally. Tergal plate 2 heart-shaped, divided in the middle, with broad posterior processes, each of which bears 3–5 long setae and a row of long spines; 3–5 setae at the lateral margins; short spines on the surface, mainly along the median line and laterally, leaving a lighter and less heavily sclerotized area anteriorly bare. Tergal plate 3 elliptical, with 4–6 short setae. Anal segment very wide, conical, its anterior margin closely following the posterior margin of tergal plate 3. Long setae posteriorly and longer and shorter setae at the sides. Pleurae covered with minute spines. Sternite 1 + 2 longer than in the male, with a ctenidium of 60 spines. Sternites 3 and 4 with marginal rows of moderately long setae. Sternite 3 with short setae on the surface, sternite 4 bare, except for a single row of short hairs laterally. Sternites 5 and 6 with lateral sclerites, those of sternite 5 not reaching the midline, with several moderately long setae posteriorly and 2 long setae laterally; 4 setae between the sclerites. The sclerites of sternite 6 reach the midline; they have a similar marginal row as sternite 5 and a row of short setae on the surface. Sternite 7 very wide, rounded, with some short setae in the middle of the posterior margin and longer setae laterally; surface with 4 long premarginal setae and a row of short vertical setae further anteriorly. Anal sclerite very small, rounded, with 2 long setae. Genital plate with 4 setae on an area of minute spines. Adanal plates with 3 short setae.

Distribution and host: Sumatra, Tarussan Bay, from *Pipistrellus macrotis*.

#### MATERIAL IN THE COLLECTION

##### SUMATRA

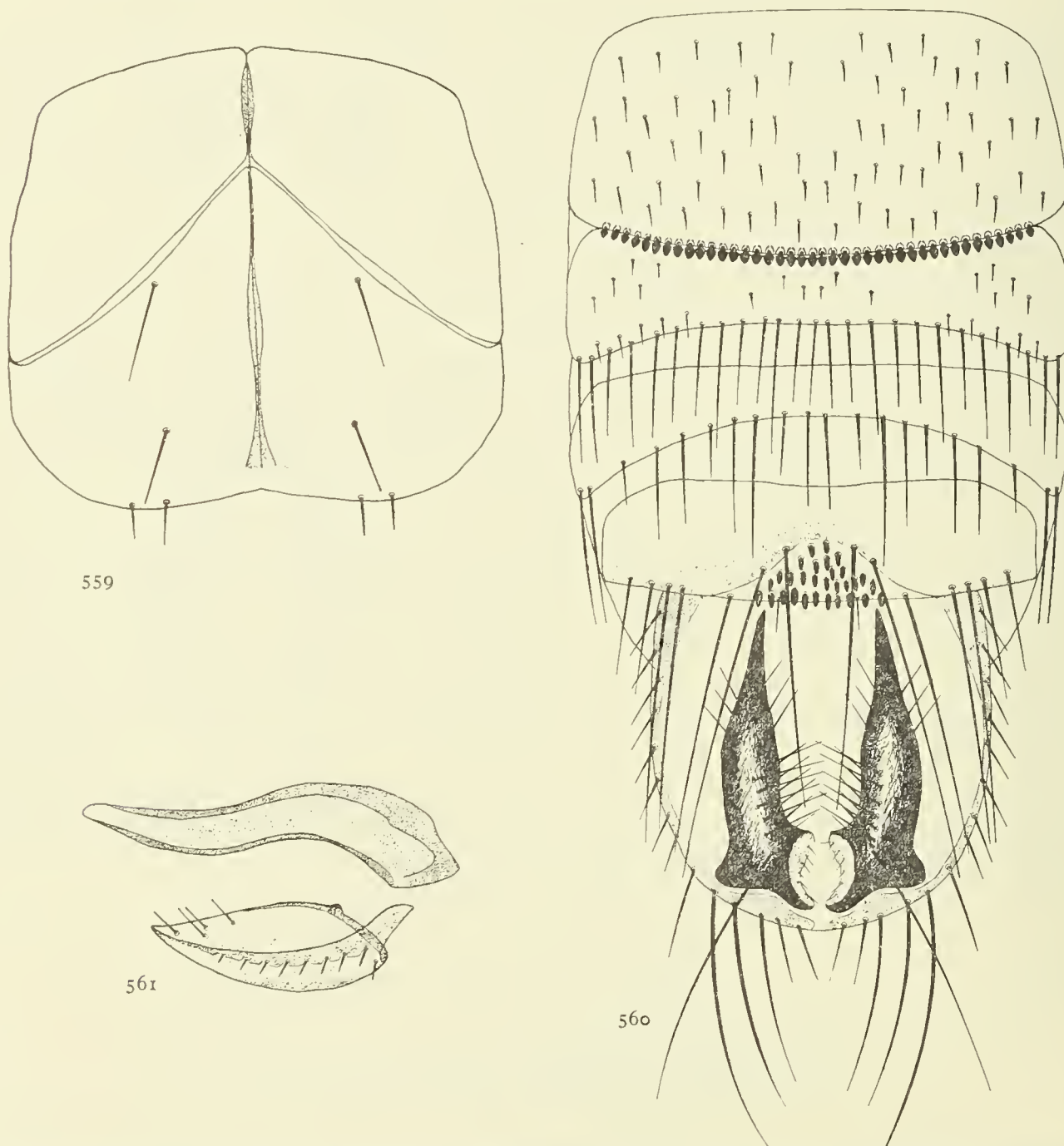
Tarussan Bay, from *Pipistrellus* sp., J. Bequaert, H. Scott, 1 ♂ 1 ♀.

#### ***Basilias (Tripselia) quadrata* n.sp.**

(Figs. 559–561)

Length 2.5 mm. Colour brown. Head long, sclerotized to the anterior dorsal margin which bears 4 setae. Terminal seta of the palps very long. Labella of the proboscis as long as the theca.

*Thorax.* Sternal plate nearly square. Median suture narrow, well marked. Angle of the oblique sutures  $90^{\circ}$ . The sutures reach the sides of the sternal plate. A long, thin vertical seta in the posterior lateral part of the surface. Only a few short hairs at the posterior margin. Mesonotum parallel-sided. 12 strong notopleural setae. Thoracic ctenidium with about 20 long, pointed spines. Lateral plates of the notopleural sutures wide. Legs long, tibiae very slender, 6.5–7 times as long as wide, tapering gradually; 3 rows of setae in the middle of the ventral side, those of the distal row reaching a little beyond the tip of the tibia, those of the other rows very short. Rings of weaker integument near the rows of setae well marked.



Figs. 559–561. *Basilia (Tripselia) quadrata* n.sp. 559. thorax, ventral; 560. male abdomen, ventral; 561. aedeagus and paramere.

*Male abdomen.* Post-spiracular sclerite short, elliptical, with 2–3 longer setae and 3–4 spines. Tergite 1 triangular, with short setae at the posterior margin and 2 groups of short setae on the surface. Tergites 2 and 3 with marginal rows of moderately long and some shorter setae in the middle. Tergites 4–6 with 2–4 very long setae in the middle of the marginal rows. A double row of short setae on the surface of tergite 2, tergites 3–6 bare. Anal segment short, cylindrical, rounded posteriorly, dorsal surface bare, except for a few premarginal setae; short setae at the sides of the segment and long, curved setae at the posterior margin. Sternite 1 + 2 with a ctenidium of 38 short, barrel-shaped spines like those on sternite 5 of some species of *Cyclopodia* and *Dipseliopoda*. This is a unique feature and has not been observed in any other species of Nycteribiidae. Surface with several rows of short setae. Sternites 3 and 4 with concave posterior margin, bearing moderately long and longer vertical and horizontal setae. A few short setae on the surface of sternite 3, sternite 4 bare. Sternite 5 longer, with a triangular group of 30 short strong spines with the apex of the group anteriorly. A single row of long setae lateral to the group of spines and 4 such setae anterior to the group. Two short, thin setae between the spines of the posterior row.

*Genitalia.* Basal arc broad, angular. Claspers darkly pigmented, with a thick base and tapering to a long point in the apical half. A long seta dorsally near the base and several rows of shorter setae in the basal half. Phallobase concave dorsally with 2 setae near the base. Aedeagus slightly curved, tapering to a blunt point. Parameres triangular, with curved ventral margin, with 3 longer hairs near the tip and a row of minute hairs along the margin.

Female unknown.

This species is provisionally placed into the subgenus *Tripselia* as it shows most affinities with it. It has, however, a number of unusual and one unique character, the structure of the abdominal ctenidium. The shape of the sternal plate is unusual for the genus and the claspers resemble those of *Dipseliopoda setosa* from Africa. Its definite position will have to be determined when the female becomes known.

NEW GUINEA. Papua, Mt Dayman, Maneau Range, from bat, 18.vii. 1953. H. M. van Deusen, ♂ holotype, TRB-22262, Chicago Natural History Museum.

### ***Basilias (Tripselia) triseriata* n.sp.**

(Figs. 562, 563)

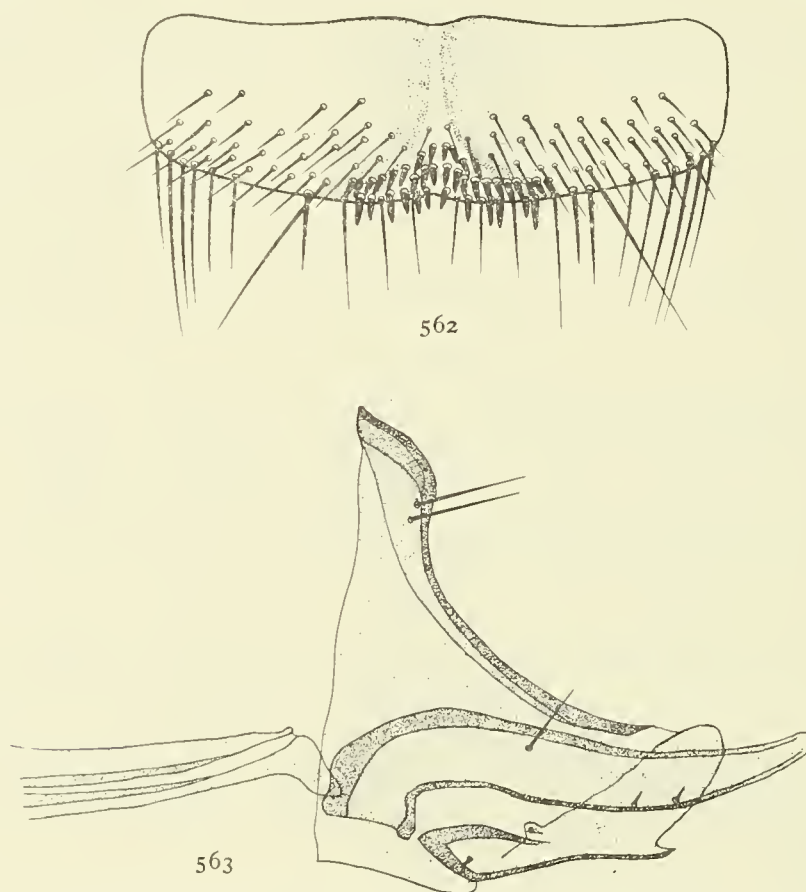
A single male from Malaya resembles *B. peselefantis* in many respects, but differs in a number of characters. It may eventually prove a subspecies of *B. peselefantis* when the female becomes known. The following account describes chiefly the differences between it and *B. peselefantis*.

Length 2.5 mm. Head with 6–8 setae at the anterior dorsal margin. Labella of the proboscis slightly longer than the theca.

*Thorax.* Wider than long. Length to width = 3 : 4. Angle of the oblique sutures 100°. Posterior row of the sternal plate consisting of moderately long and shorter setae. Lateral plates of the notopleural sutures wide. 10–11 notopleural setae. Tibiae very slender, about 7 times as long as wide, tapering gradually at the apical end, with 3 rows of setae in the distal half of the ventral edge and clearly marked rings of weaker integument.



*Male abdomen.* Dorsally as in *B. peselefantis*, but the short hairs on the tergites are more numerous and form a premarginal row on tergite 6. The dorsal surface of the anal segment is covered with short setae which reach nearly to the anterior margin. Abdominal ctenidium with 65 long spines. Sternite 5 with a group of 38 strong spines in 3 rows. The group is slightly angular anteriorly and the spines of the posterior row are longer than the others; 3 rows of short setae on the surface.



Figs. 562, 563. *Basilia (Tripselia) triseriata* n.sp. Male. 562. sternite 5; 563. genitalia.

*Genitalia.* Claspers darkly pigmented. Aedeagus bent near the base, thick, tapering to a blunt point in the apical third. It is about 6 times as long as wide in the middle. Parameres with broadly rounded apical end and a sharp ventral tooth. Phallobase with 4 setae near the base and 2 near the apical end.

MALAYA. Selangor, Kuala Lumpur, from *Nyctalus stenopterus*, 13.ix. 1956, ♂ holotype. Chicago Natural History Museum.

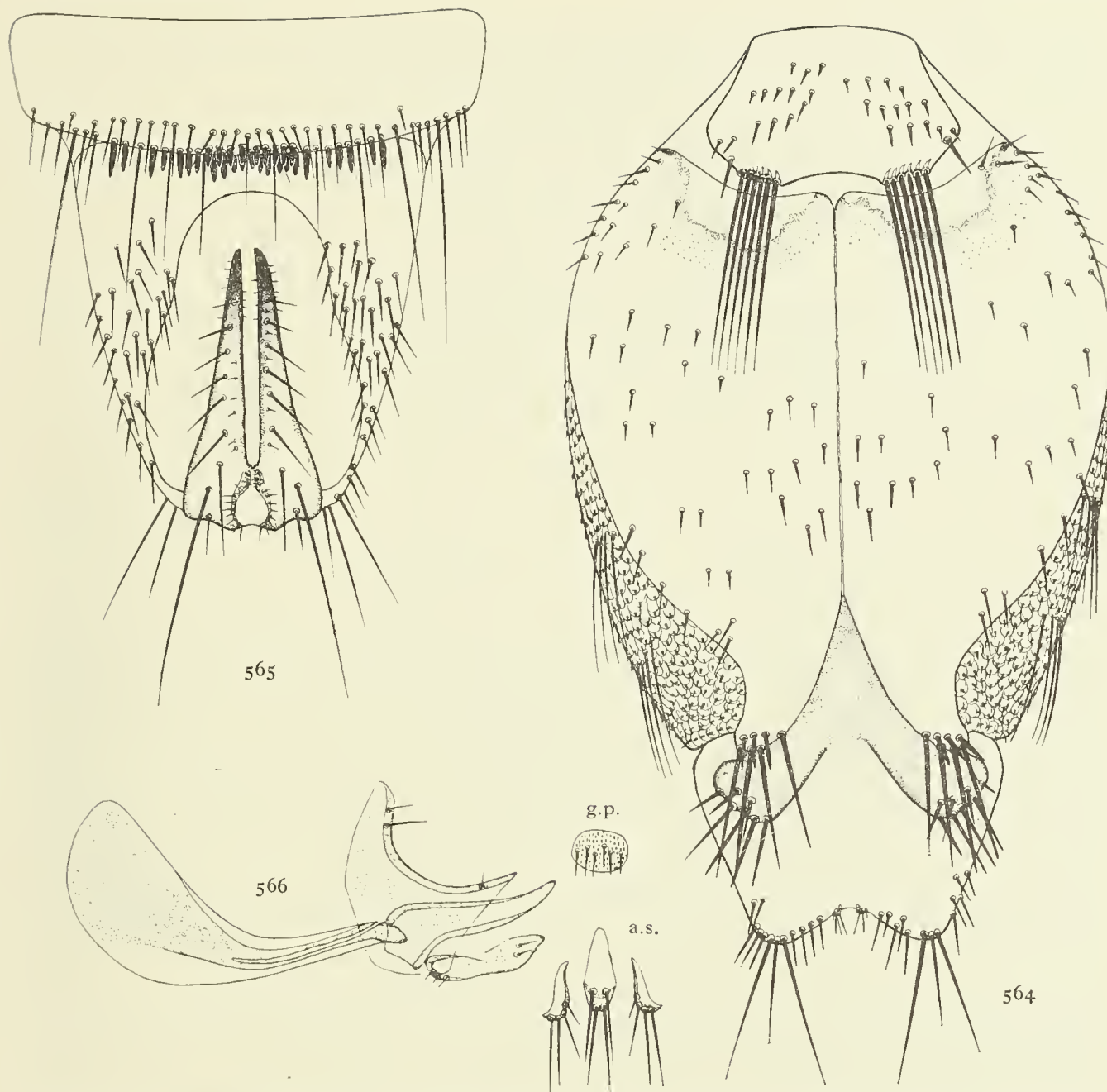
### ***Basilia (Tripselia) trougtoni* (Musgrave, 1927)**

(Figs. 564-566)

*Nycteribia trougtoni*. Musgrave, 1927, *Rec. Austr. Mus.* 15, 263.

*Nycteribia brevicauda*. Musgrave, 1925, *Rec. Austr. Mus.* 14, 289 (male).

Length 2-2.3 mm. Colour brown. Head with 4 setae at the anterior dorsal margin and 2 setae between the eyes. Labella of the proboscis shorter than the theca.



Figs. 564-566. *Basilia (Tripselia) trougtoni* (Musgrave). 564. female abdomen, dorsal, with genital plate and anal sclerites; 565. male sternite 5 and genital area; 566. male genitalia.

*Thorax.* Wider than long. Length to width = 2 : 3. Median suture well marked, narrow. Angle of oblique sutures  $100^{\circ}$ . Posterior margin of the sternal plate with short setae and 3 longer setae in each half. Mesonotum wide. 10-13 notopleural setae. Tibiae 5 times as long as wide, tapering gradually towards the apical end, with 3 rows of setae in the distal half of the ventral edge.

*Male abdomen.* Post-spiracular sclerite with 3 setae and several short spines. Tergite 1 with a marginal row of short setae with a gap in the middle. Tergites 2 and 3 with marginal rows of moderately long setae alternating with long spines. Tergites 4-6 with marginal rows of longer setae, particularly 2-4 setae in the marginal rows of tergites 5 and 6. The spines on the posterior

tergites are also longer. Tergite 2 with a double row of short setae on the surface, tergites 3–6 bare. Anal segment conical, with thick, long spines on the posterior part of the dorsal surface. Sternite 1 + 2 with a ctenidium of 50–60 very long, strong spines. They are much longer than in, for instance, *B. falcozi*. Surface covered with short setae. Sternites 3 and 4 with marginal rows of longer setae laterally and shorter setae in the middle. Surface of sternite 3 with several rows of short setae. Sternite 4 bare, except for a premarginal row of short hairs at the sides. Sternite 5 longer, with a group of 25–30 spines in 2 rows at the posterior margin. The posterior row consists of 18 longer spines and is more widely spaced with thin setae between the spines. The anterior row consists of 12 shorter spines placed close together opposite the 7–8 median spines of the posterior row. Long and short setae laterally and a premarginal row of thin, short setae. Anal segment with dense groups of thick setae at the sides of the ventral surface.

*Genitalia.* Claspers straight, pigmented in the apical half, with a long seta dorsally near the base and shorter setae up to the apical third. Basal arc triangular, with a long anterior process. Aedeagus short, wide at the base, tapering to a blunt tip, slightly curved. Apodeme with a very wide end-plate. Parameres with short, triangular apical end and obtuse ventral angle. Phallobase concave dorsally, with 4 setae near the base and 2 near the apical end.

*Female abdomen.* Tergite 1 with 2 groups of 6–7 closely placed setae at the posterior margin and a wide gap between them. A single short seta lateral to the 2 groups and short setae on the anterior lateral part of the surface. The margin of the sclerite is not pigmented as in some other species. Tergal plate 2 heart-shaped, divided in the middle, with broad posterior processes which bear 4 long setae and 3 spines. The setae are much shorter and thicker than those of tergite 1. Short spines on the surface, except in an area anteriorly and another posteriorly in the middle. 4–5 short setae along the lateral margins. Tergal plate 3 divided into lateral rounded lobes, each bearing 4 short setae and 3–4 short spines, all directed obliquely laterally. Anal segment wider than long, conical, with long and short setae posteriorly and a few short setae at the sides in the posterior part. Sternite 1 + 2 very long, with a ctenidium of 68 very long spines. Sternites 3 and 4 with marginal rows of short setae and short hairs on the surface of sternite 3. Sternite 4 shorter and bare. Sternite 5 with narrow lateral sclerites which bear moderately long setae at the posterior margin and long setae laterally. Sternites 6 and 7 fused, marginal row of sternite 6 similar to that of sternite 5; a row of shorter setae on the surface. Sternite 7 large, rounded posteriorly, with a marginal row of short thick setae in the middle and long setae laterally. A double premarginal row of short setae on the surface. Genital plate with a transverse row of 6 short setae on an elliptical area of minute spines. Anal sclerite with 4 setae posteriorly. Adanal plates triangular, with 4 setae.

Distribution and host: New South Wales, from *Chalinolobus gouldii*.

#### MATERIAL IN THE COLLECTION

##### AUSTRALIA

Parramatta, New South Wales, from *Pteropus*\* *gouldii*, 1 ♂. Challenger Expedition (Brit. Mus. 1911.103).

#### GENUS *STEREOMYIA* n.gen.

The habitus of the insects is that of a *Penicillidia*, very setose, broadly built, with fused oblique sutures of the sternal plate of the thorax and with slender, parallel-sided tibiae. On the other

\* Probably an error for *Chalinolobus*.



hand, there are a number of characters which differ from all species of *Penicillidia* and some which are unique. The insects differ from *Penicillidia* in the following characters: Absence of eyes, form of the mesonotum, large number of notopleural setae, incomplete cover of the haltere groove, presence of a post-spiracular sclerite and the structure of the male genitalia. The development of the basal sclerites of the abdomen of the female is unique. It resembles in its extreme degree that of *Basilia roylii*, but differs in its form and in the fact that the spiracles are normally distributed and not concentrated in the posterior part of the abdomen. The structure of the male genitalia, of the genital plate of the female and of the adanal plates resemble those of the genus *Basilia*. *Basilia (Tripselia) hirsuta* from New Guinea shows a development in the direction of the habitus of a *Penicillidia*, but has the characters of the genus *Basilia* clearly marked. It has tergal plate 2 divided into 4 longitudinal parts, a character which is also present in a rudimentary form in the species described here. This species, however, cannot be included in *Basilia* as it differs from it in a number of fundamental characters and has therefore to be placed into a separate genus.

Type species: *Stereomyia armata* n.sp.

*Diagnosis.* Large, broadly built insects. The whole body is densely covered with short setae of nearly uniform length. There are a number of longer setae at the margins of the sclerites, but very long and strong setae are absent.

Head moderately compressed laterally, sclerotized up to the anterior dorsal margin. Eyes absent. Thorax much wider than long. Oblique sutures of the sternal plate fused. Thoracic ctenidium with pointed spines. Mesonotum parallel-sided, rounded posteriorly. Notopleural setae very numerous, arranged in several rows. Haltere groove with an incomplete cover. Tibiae parallel-sided, slender, with 4–5 rows of short setae near the distal end of the ventral edge. Post-spiracular sclerite large, wide, with several rows of setae. Abdomen of the male with normal segmentation. Abdominal ctenidium much reduced, with only a few spines among a marginal row of short setae. Sternite 5 with a group of spines at the posterior margin. Genitalia of *Basilia* type.

*Female abdomen.* The basal tergal and sternal plates cover the greater part of the abdomen. No other sclerites are visible between the basal tergal plate and the anal segment. Sternites 5–7 present. Abdominal ctenidium absent. Spiracles normally distributed. Genital plate, anal sclerite and adanal plates as in the subgenus *Tripselia*.

Some of the characters given above may prove of specific rank only when related species become known.

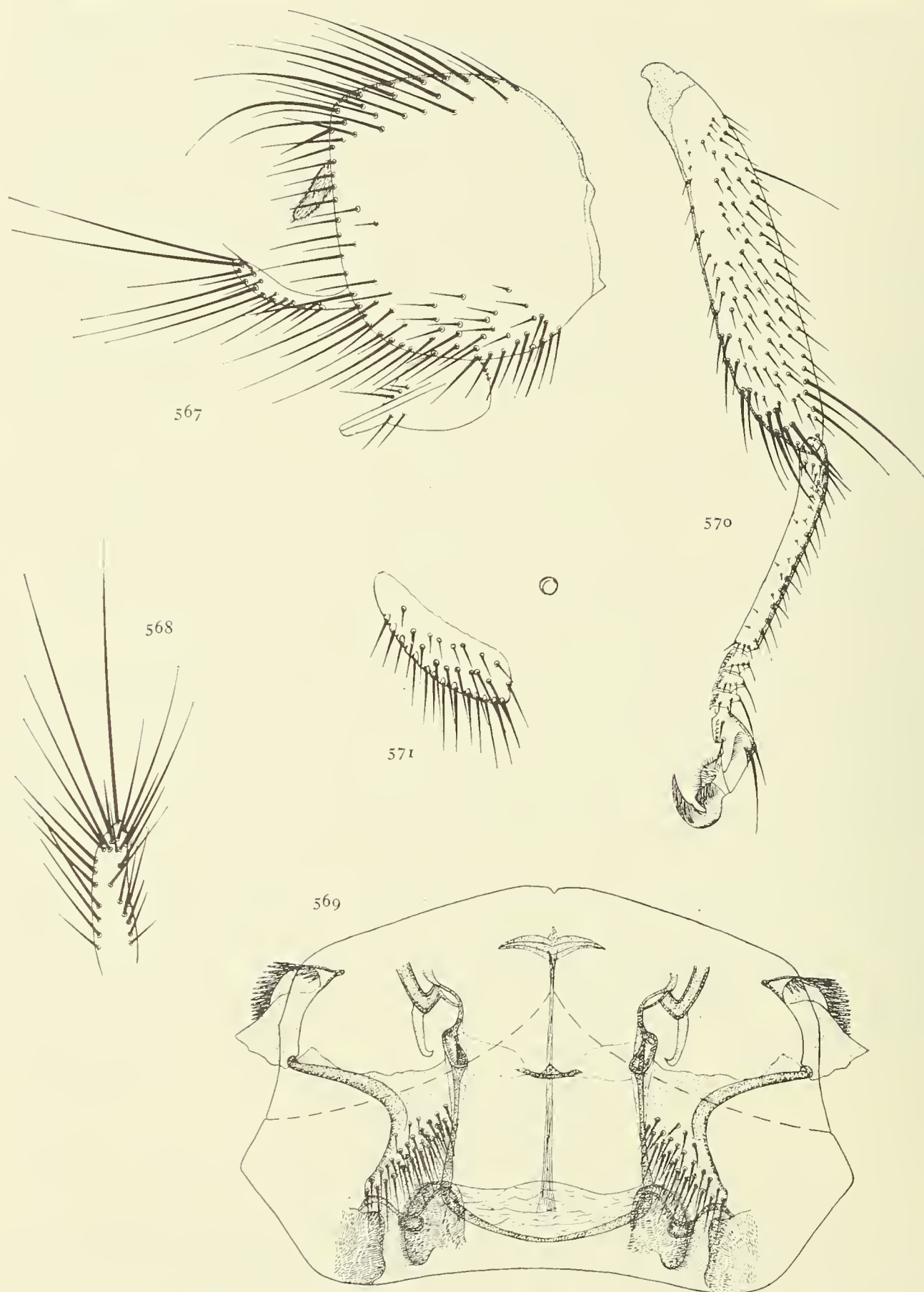
### ***Stereomyia armata* n.sp.**

(Figs. 567–577)

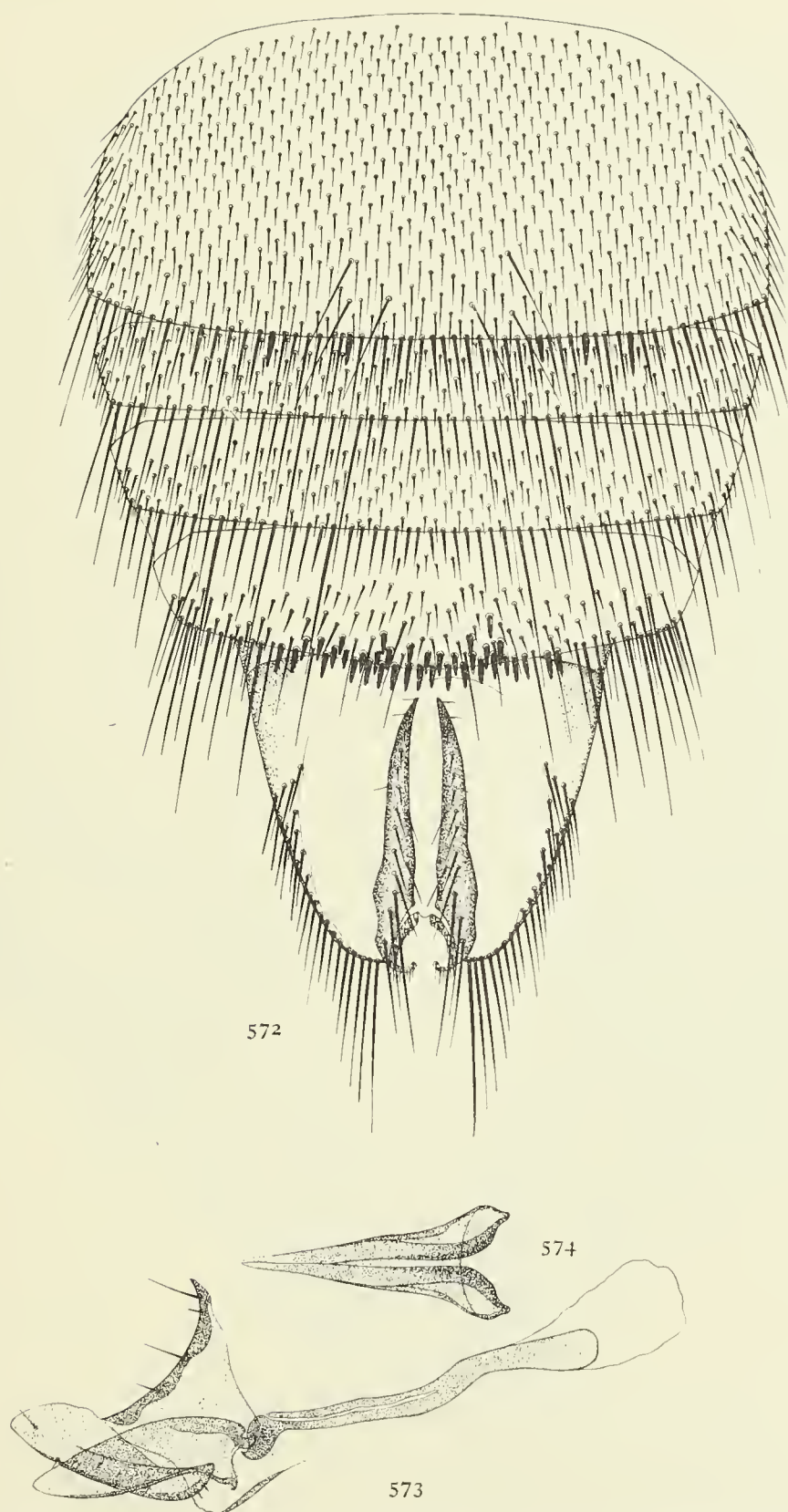
Length 3.5–4 mm. Colour reddish brown.

*Head.* Dorsal surface covered with short setae in its greater part. Several rows of setae on the genae. Palps with a marginal row of short setae and several fairly long setae near the tip at the ventral surface. Labella of the proboscis about half as long as the theca.

*Thorax.* Much wider than long. Length to width = 3 : 4. Median suture well marked,



Figs. 567-571. *Stereomyia armata* n.sp. 567. head, lateral; 568. palp, ventral; 569. thorax, dorsal; 570. tibia and tarsus of leg 1; 571. post-spiracular sclerite.



Figs. 572-574. *Stereomyia armata* n.sp. Male. 572. abdomen, ventral; 573. genitalia, profile; 574. aedeagus, dorsal.



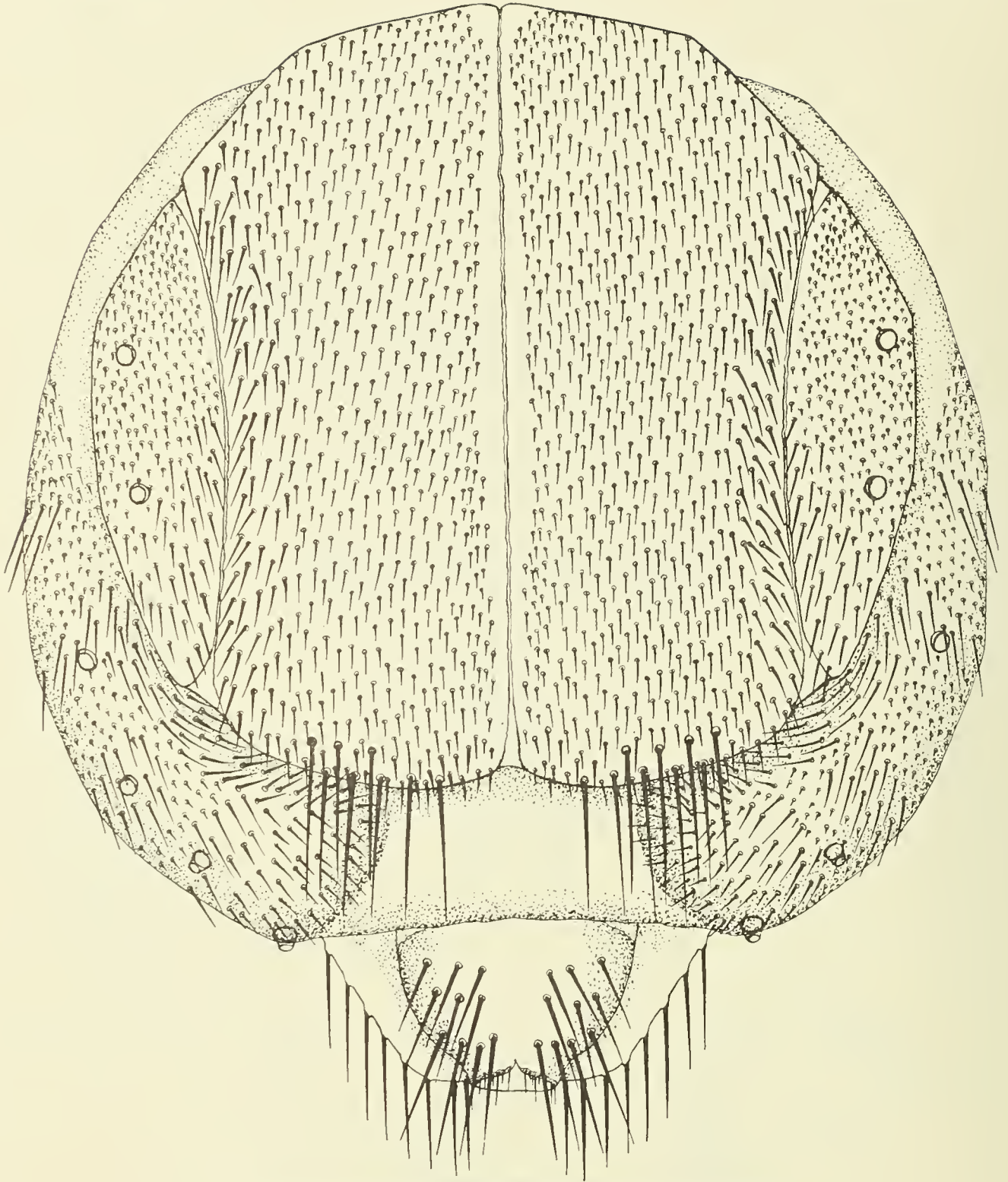


Fig. 575. *Stereomyia armata* n.sp. Female abdomen, dorsal.

narrow. Oblique sutures fused, forming an angle of about  $100^\circ$ . Thoracic ctenidium with about 20 pointed spines. Mesonotum wide, parallel-sided, rounded posteriorly. Lateral plates of the notopleural sutures wide, with numerous notopleural setae in several rows. Mesopleural sutures curved, running at the outside of the lateral plates from coxa 2 to the posterior spiracle. Haltere groove partly covered by a flap which is attached to the median side of the groove. Legs long,

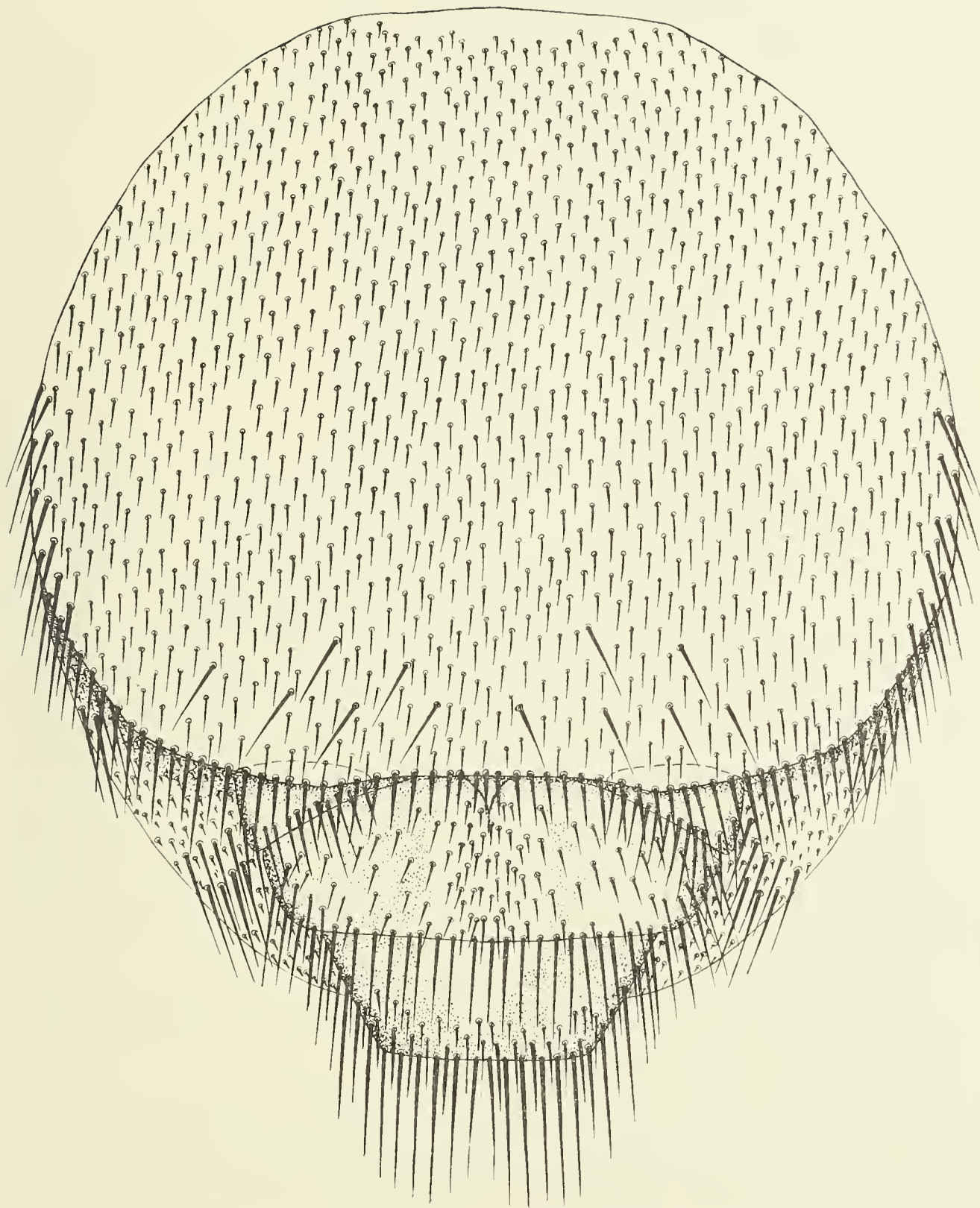


Fig. 576. *Stereomyia armata* n.sp. Female abdomen, ventral.



femora thick, without a basal ring of weaker integument. Tibiae slender, 6 times as long as wide, parallel-sided, with 4–5 rows of short setae near the distal end.

*Male abdomen.* Post-spiracular sclerite wide, curved, with several rows of short setae. Tergite 1 mainly membranous, with a more heavily sclerotized, elliptical area in the middle which is covered with short setae, with an incomplete marginal row of short setae, best marked in the lateral corners. Tergites 2–6 with marginal rows of short setae which are longer on the posterior tergites; surface covered with short hairs. Anal segment short, conical, with straight anterior dorsal margin and short setae on the posterior part of the dorsal surface and longer setae posteriorly. Sternite 1 + 2 trapezoidal, with a marginal row of short setae and 4–6 spines among them in the middle; surface covered with short setae and with 6 longer setae in the posterior part of the surface. Sternites 3 and 4 with marginal rows of short setae and a few longer ones; surface with short hairs and a few premarginal, vertical longer setae. Sternite 5 longer, with convex posterior margin which bears a group of 35–40 spines in 3 rows. The spines of the posterior row are longer than the others and about 20 in number.

*Genitalia.* Claspers thin, slightly curved, with a row of setae in the basal half of the dorsal surface, the basal setae longer. Basal arc rounded, with a long anterior process. Aedeagus short, thick, slightly curved, triangular in dorsal view, tapering to a blunt point. Apodeme with a narrow end-plate. Phallobase slightly concave dorsally, with 4 setae near the base and 2 in the middle. Parameres with broadly triangular end, with curved sides and a few minute hairs.

*Female abdomen.* The basal tergal plate covers the greater part of the dorsum. It is divided in the middle and covered with short hairs. A few moderately long setae at the posterior margin and a few such premarginal setae in each half. The lateral parts of the tergal plate are separated from the median parts by a longitudinal suture. They are covered with minute spines anteriorly and with short setae posteriorly. The two median parts perhaps represent the first tergite and the two lateral parts the second tergal plate, pushed aside by the greatly enlarged tergite 1. Dorsum of the abdomen bare between the basal tergal plate and the anal segment. The pleurae are covered with minute spines and with irregular rows of short setae which may indicate margins of segments. Anal segment short, conical, with short setae on the dorsal surface and longer setae posteriorly. The basal sternal plate covers the greater part of the ventral surface. It is broadly elliptical, with a marginal row of short setae posteriorly and laterally. There is no ctenidium. Surface covered with short hairs and with several rows of widely spaced setae in the posterior part of the surface. There is a row of setae on the connexivum close to the posterior margin of the sternal plate which is covered by it in most specimens. Sternite 5 consists of 2 widely separated triangular sclerites with moderately long setae at the posterior margin and with bare surface. Sternite 6 undivided, trapezoidal, with convex anterior margin and with a marginal row of short setae in the middle and longer setae laterally. The surface is covered with short hairs which are shorter and placed more closely in the middle. Sternite 7 also trapezoidal, with the short side posteriorly. It has a marginal row of longer setae and 2–3 rows of shorter setae on the posterior part of the surface. Spiracles 1–7 normally distributed. Anal sclerite drop-shaped, with 8–10 setae. Adanal plates triangular, with 6–8 setae. Genital plate with a few short setae on a broad field of minute spines.



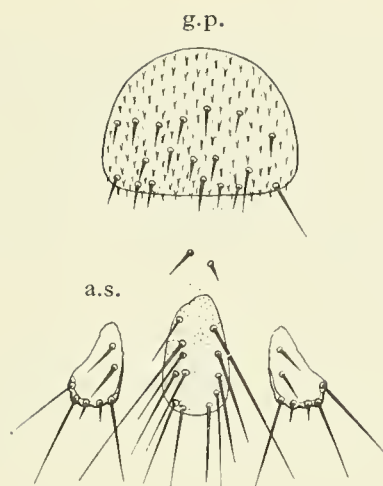


Fig. 577. *Stereomyia armata* n.sp. Female genital plate and anal sclerites.

#### MATERIAL IN THE COLLECTION

##### NEW GUINEA

Enaena, Mt Simpson, S.E. Papua, from *Philetor rohui*, 30.viii. 1940, F. Shaw Mayer, ♀ holotype, 4 ♂ 1 ♀ paratypes (Brit. Mus. 1941.58 and 1946.288).

#### GENUS *HERSHKOVITZIA* Guimarães & d'Andretta, 1956

*Herskovitzia*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1. Type species: *Herskovitzia primitiva* Guimarães & d'Andretta, 1956.

Head funnel-shaped, laterally compressed. Eyes with a single lens, projecting from the surface, or absent. Arista club-shaped. Notopleural sutures diverging posteriorly, without lateral plates. 2-4 notopleural setae. Sternal plate of the thorax much wider than long, with open oblique sutures which reach the sides and a second suture at the level of coxa 2. Legs: Tibia 1 laterally compressed, with strongly curved ventral side and several rows of setae in the distal half. Tibia 2 either sub-conical or elliptical, with several rows of setae in the middle. Tibia 3 either similar to tibia 1 or to tibia 2. Haltere groove open. Post-spiracular sclerite with several setae. Abdomen of both sexes with tergites 1 and 2 fused. Segmentation of the male abdomen normal, with deeply incised sternite 5 and an armature of spines at the incision. Genitalia of *Nycteribia* type. Phallobase divided longitudinally or not divided. Female abdomen with 7 tergites and sternites. Anal sclerite absent. Genital plate with several setae.

#### *Herskovitzia primitiva* Guimarães & d'Andretta, 1956

*Herskovitzia primitiva*. Guimarães & d'Andretta, 1956, *Arq. Zool. São Paulo*, 9, 1.

Length 2.5 mm. Head membranous in an anterior triangular area on the dorsal surface. 4 setae at the anterior dorsal margin. Eyes with a single lens, projecting from the surface, with pigmented base. Palps widened apically, with a long terminal seta, 2 longer setae near the tip and short setae basally. Labella of the proboscis about half the length of the theca.

*Thorax.* Wider than long. Length to width = 2 : 3. Notopleural sutures diverging posteriorly, without lateral plates and with 4 notopleural setae near the base of the mesopleural suture. Angle of the oblique sutures slightly more than 90°. Legs: Tibia 1 three times as long as wide, with curved ventral edge and 4 rows of setae in the distal half. Basitarsus 1 is more than half the length of the tibia. Tibia 2 sub-conical, widest at the base, 4 times as long as wide, with 3 rows of short setae in the basal half. Basitarsus 2 a quarter the length of the tibia. Tibia 3 similar to tibia 1, but more slender, 4 times as long as wide, with 5 rows of setae in the distal half. Basitarsus 3 a quarter the length of the tibia.

*Male abdomen.* Tergite 1 + 2 to tergite 4 with marginal rows of moderately long setae and short setae on the surface. Tergites 3–5 covering the pleurae, so that they are visible from the ventral side. Tergites 5 and 6 with marginal rows of longer setae and with short setae in the posterior part of the surface. Anal segment conical, rounded posteriorly, with a long seta at the middle of the sides and short setae along the margin. Sternite 1 + 2 short, rounded anteriorly, with a ctenidium of 48 spines. Sternites 3 and 4 less wide than the abdomen, with marginal rows of moderately long setae and 2–3 rows of short setae on the posterior part of the surface. Sternite 5 longer, with a deep incision of the posterior margin and 4–5 spines at the sides of the incision.

*Genitalia.* Claspers straight, with 2 short setae dorsally near the base and some minute hairs along the clasper. Basal arc with a long anterior process. Basal plate angular. Phallobase with 2 pairs of short setae near the base, divided longitudinally. Aedeagus cylindrical, with membranous distal part. Parameres triangular, with long apical end.

*Female abdomen.* Tergite 1 + 2 as in the male. Tergites 3–5 rectangular, sclerotized, with marginal rows of moderately long setae and short setae on the surface. Tergite 6 divided into lateral sclerites with marginal rows of longer setae and short setae on the surface. Tergite 7 undivided, less wide than the abdomen, trapezoidal, with a similar marginal row and setae on the surface. Anal segment very short, broadly conical and with a transverse row of short setae posteriorly. Sternite 1 + 2 with a ctenidium of 52 spines. Sternites 3–6 divided into lateral sclerites, with marginal rows of long setae and surface covered with short setae. Sternite 7 undivided, rounded posteriorly, with a similar marginal row and with 2 irregular rows of short setae on the surface. Genital plate triangular with a few short setae. Anal sclerite absent.

Distribution and host: Colombia, Bolivar, from *Thyroptera discifera*.

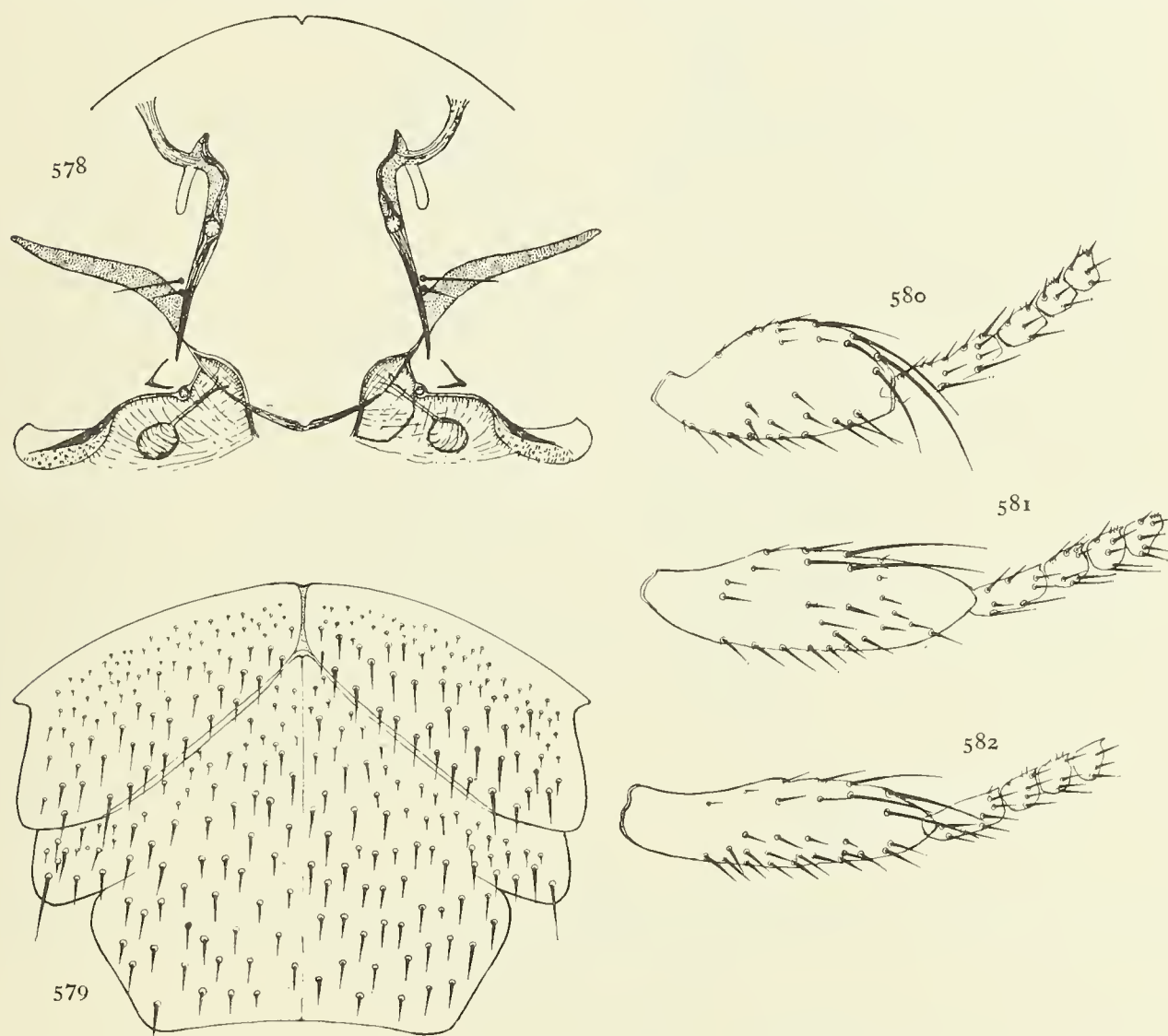
### **Herskovitzia coeca** n.sp.

(Figs. 60, 578–584)

A single female without data about host and locality was found in the Rothschild collection. It differs from *Herskovitzia primitiva* in the absence of eyes and in details of the structure of the legs. As the new species resembles *H. primitiva* in most respects, the differences are chiefly stressed.

Length 2.5 mm. Head with 4 setae at the anterior dorsal margin. Eyes absent. Palps with 2 terminal setae, 1 long, 1 shorter. Labella of the proboscis about one-third of the length of the theca. Arista club-shaped.

*Thorax.* Resembling *H. primitiva* in most respects. Length to width = 2 : 3. Only 2 notopleural setae. Tibia 1 with strongly curved ventral edge, nearly semi-circular, twice as long as wide, with 4 rows of curved setae in the distal half of the ventral edge. Basitarsus 1 half the length of the tibia. Tibia 2 elliptical, widest in the middle, with 2-3 rows of setae in the middle, those of the distal row reaching a little beyond the end of the tibia. Basitarsus 2 a quarter the length of



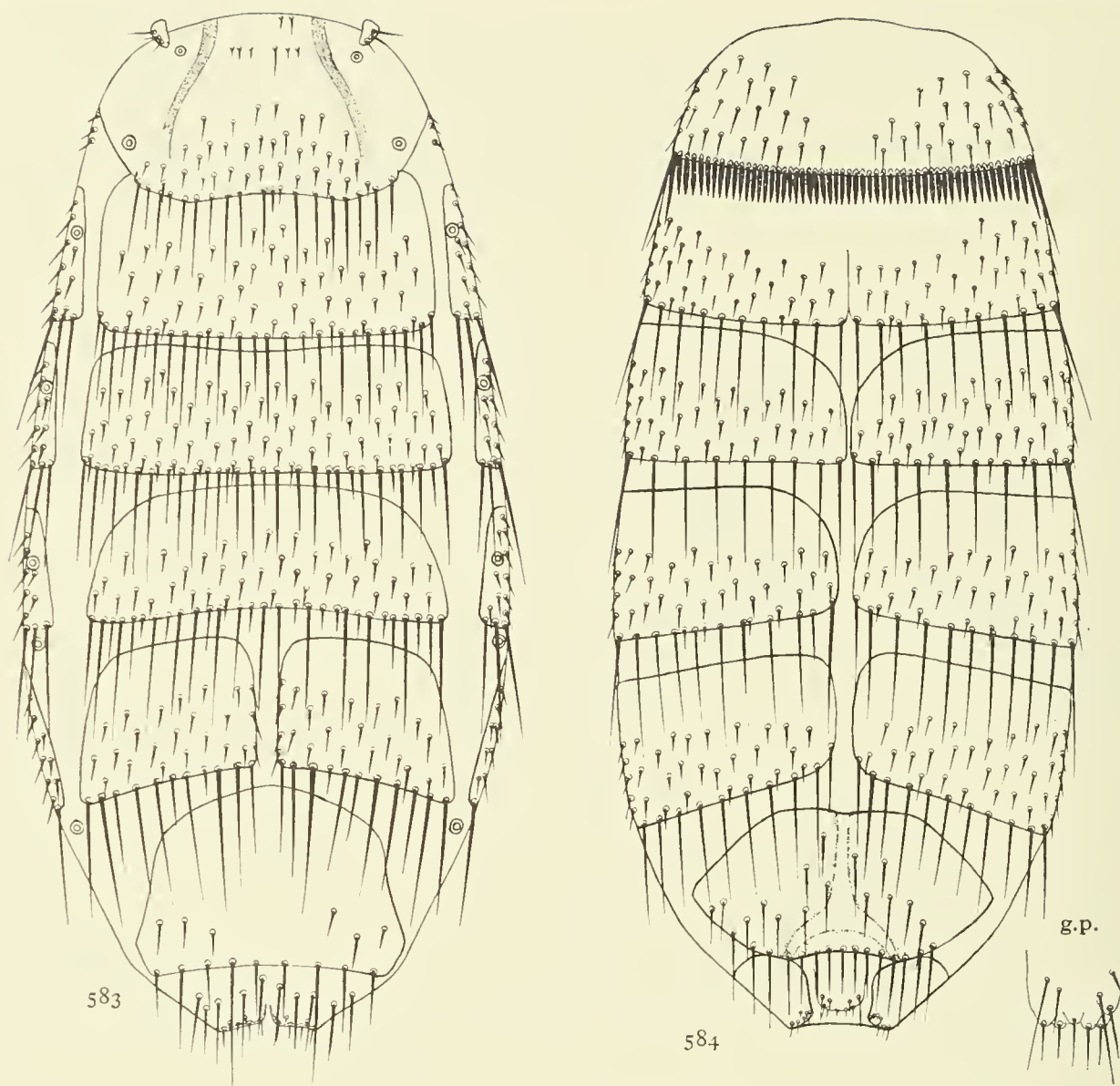
Figs. 578-582. *Herskovitzia coeca* n.sp. 578. dorsal pattern of thorax; 579. thorax, ventral; 580-582. tibia and tarsus of legs 1-3 respectively.

the tibia. Tibia 3 intermediate in form between tibiae 1 and 2, slender, 4 times as long as wide, with 4 rows of setae mainly in the distal half, widest in the distal half. Basitarsus 3 a quarter of the length of the tibia.

*Female abdomen.* Resembling in most respects *H. primitiva*, with fused tergites 1 and 2 and with 7 sclerotized tergites and sternites. Abdominal ctenidium with about 50 sharp spines, the lateral spines much longer than the others. Post-spiracular sclerite with 3-4 setae. Genital plate broadly rounded posteriorly, with about 10 setae.

Male unknown.





Figs. 583, 584. *Hershkovitzia coeca* n.sp. Female. 583. abdomen, dorsal; 584. same, ventral, with genital plate.

MATERIAL IN THE COLLECTION

♀ holotype, bat no. 35, no further data, N. C. Rothschild.

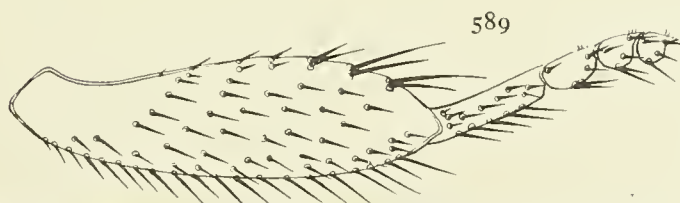
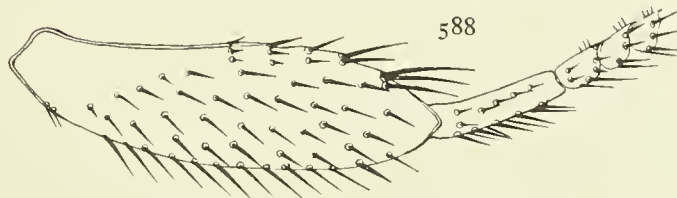
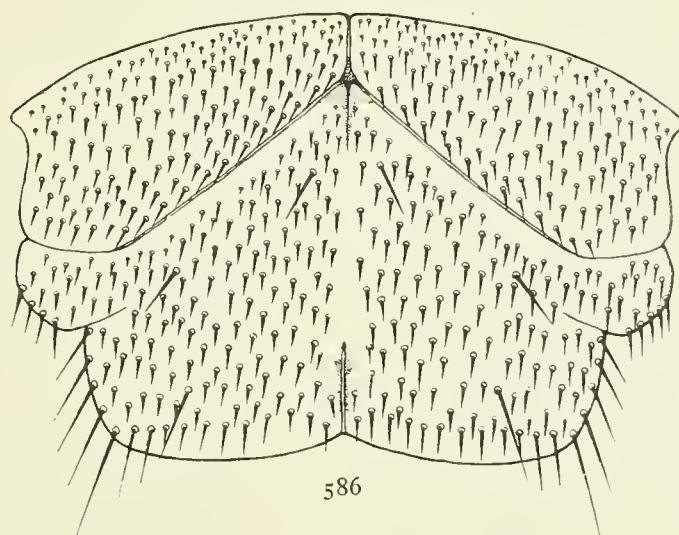
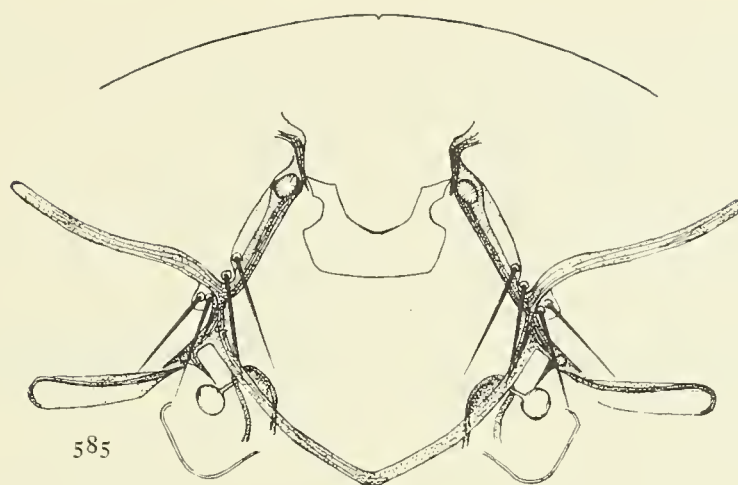
***Hershkovitzia inaequalis* n.sp.**

(Figs. 585-594)

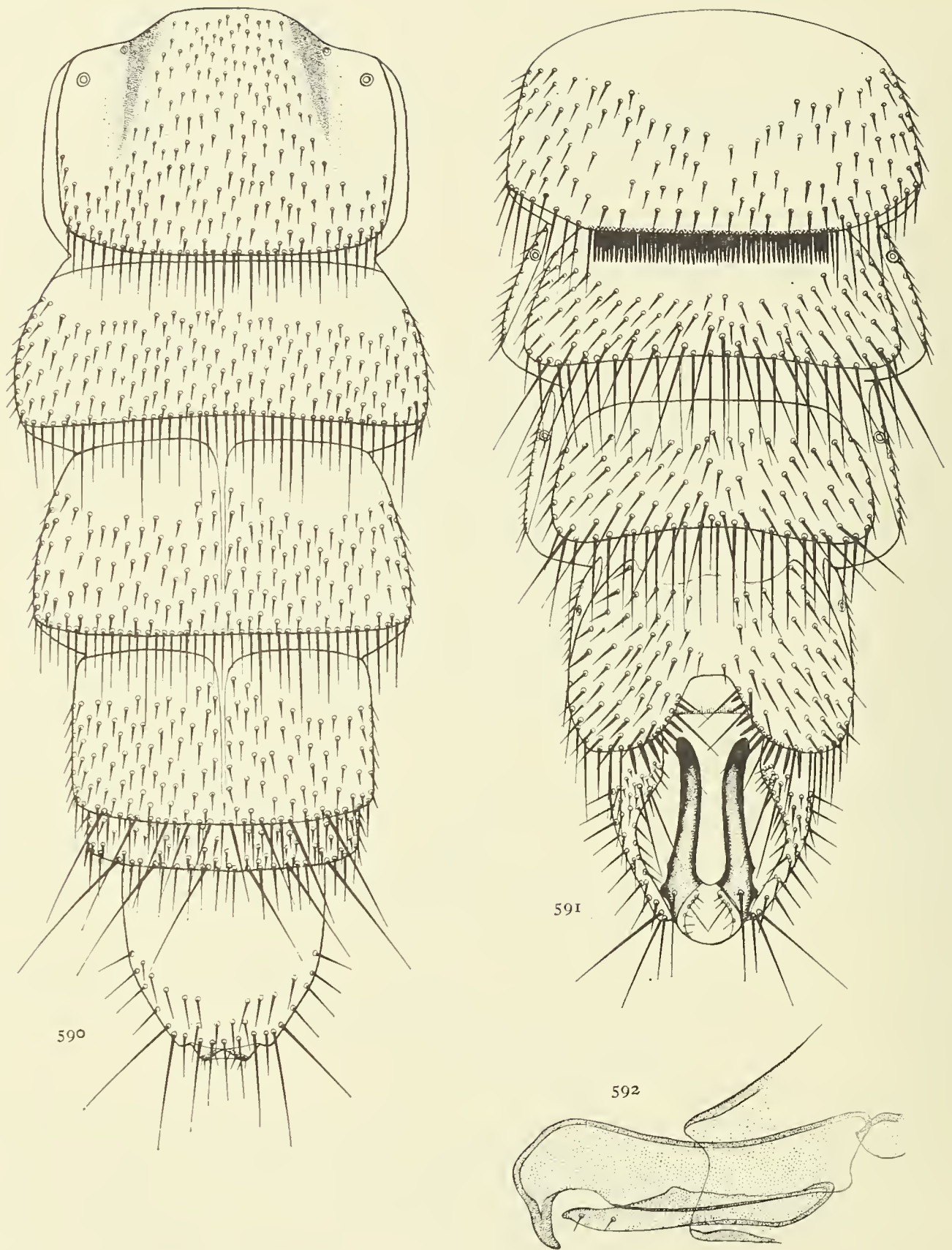
Length 3-3.25 mm. Colour reddish brown.

*Head.* Sclerotized up to the anterior dorsal margin which bears 4 setae. Eyes close to the anterior margin near the setae, consisting of a single unpigmented lens which projects from the surface. Labella of the proboscis as long as the theca. Palps with moderately long terminal setae, another long seta near the tip and marginal rows of shorter setae. Arista of the antenna club-shaped with short branches.

*Thorax.* Very wide, rectangular. Length to width = 2 : 3. Angle of the oblique sutures



Figs. 585-589. *Hershkovitzia inaequalis* n.sp. 585. dorsal pattern of thorax; 586. thorax, ventral; 587-589. tibia and tarsus of legs 1-3 respectively.



Figs. 590-592. *Hershkovitzia inaequalis* n.sp. Male. 590. abdomen, dorsal; 591. same, ventral; 592. genitalia.

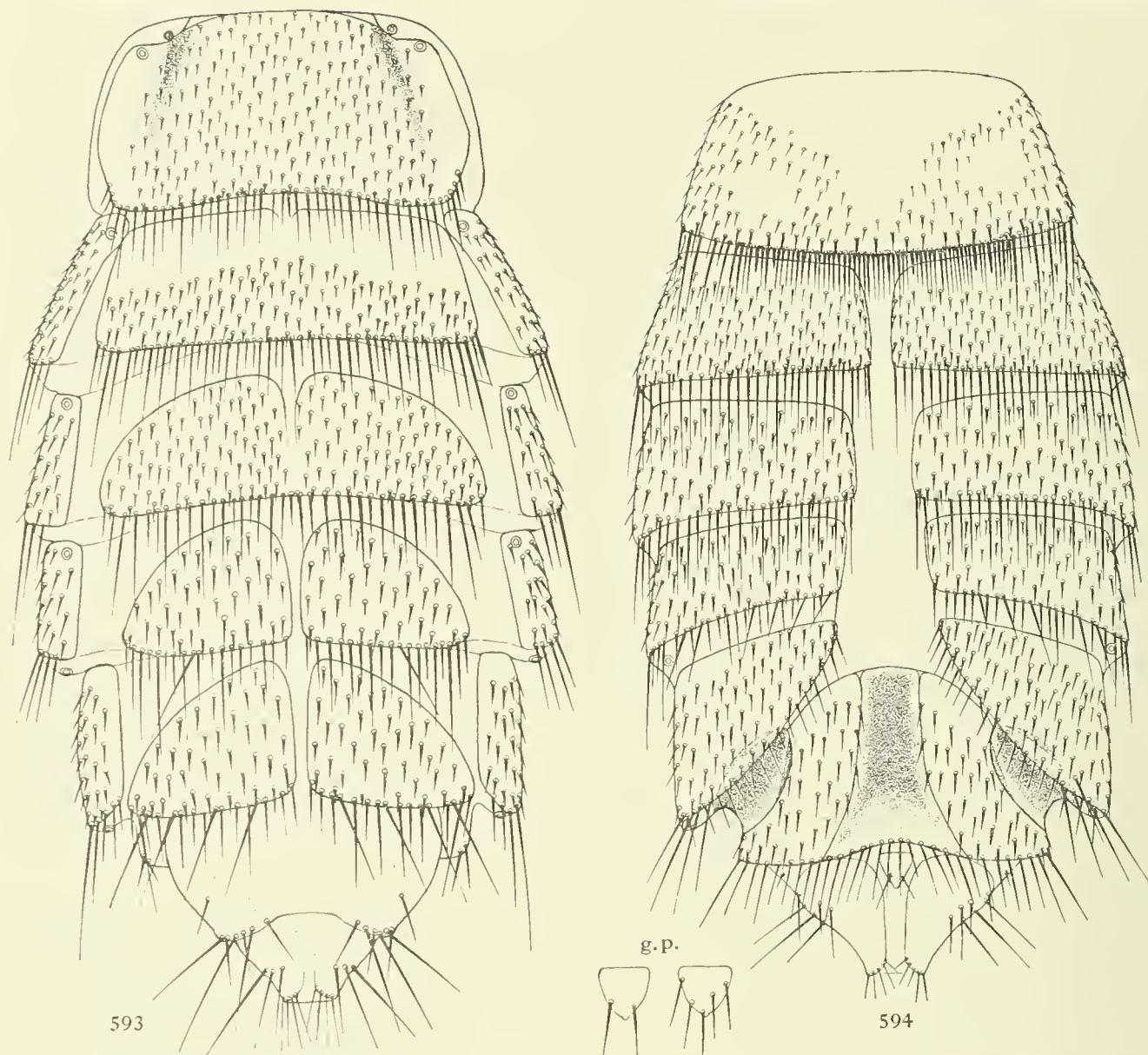


105°. 6 vertical setae in the posterior part of the sternal plate. Posterior margin of the sternal plate with short setae and a few longer setae at the lateral corners. Notopleural sutures sharply diverging posteriorly, so that the mesonotum is twice as wide posteriorly as between the anterior spiracles. Four notopleural setae near the base of the mesopleural suture. Legs: Coxa 1 broadly triangular, femur 1 very wide, laterally compressed. Tibia 1 with strongly curved ventral margin, laterally compressed, 2.5 times as long as wide, with 4–5 rows of setae in the distal half of the ventral margin. Basitarsus 1 about half as long as the tibia. Tibiae 2 and 3 nearly elliptical, slightly wider in the distal half, nearly 4 times as long as wide, with 4–5 rows of short setae in the distal half of the ventral margin. Basitarsi 2 and 3 about one-third of the length of the tibiae. Tibia 3 narrower at the base than tibia 2.

*Male abdomen.* Tergite 1 + 2 nearly rectangular, with a marginal row of short setae. Tergite 3 wider, with a marginal row of longer setae. Tergites 4 and 5 similar, but divided in the middle. Tergite 5 narrower than the preceding ones and with longer setae in the marginal row. Tergite 6 very short, with a similar marginal row as tergite 5. Surface of all tergites covered with short setae except on an anterior strip on tergites 3–5. Anal segment short, conical, with rounded sides and long setae posteriorly and short setae laterally and in the posterior half of the dorsal surface. Sternite 1 + 2 wide, rectangular, with a ctenidium of 53 narrow spines which do not reach the lateral corners, but leave the lateral quarters free which bear a row of ordinary setae. Sternites 3 and 4 with marginal rows of uniformly long, thin setae. Surface covered with vertical setae which are longer in the premarginal row and shorter anteriorly. Sternite 5 longer, rounded posteriorly, with a deep concavity in the middle of the posterior margin. 7–9 spines along the sides of this concavity and moderately long setae laterally. Surface with vertical setae which are longer in the premarginal row and shorter anteriorly.

*Genitalia.* Claspers short, slightly curved, darkly pigmented. Only a single seta dorsally near the base. Phallobase short, cylindrical. Aedeagus cylindrical, with a long, beak-shaped process ventrally near the apical end. Parameres very narrow, triangular, with 2 minute hairs near the apical end.

*Female abdomen.* Tergite 1 + 2 as in the male, but wider. Tergites 2 and 3 with marginal rows of moderately long setae and short setae on the surface. Tergites 4–6 divided into lateral sclerites of more or less triangular shape. Both the marginal setae and the short setae of the surface are longer on the posterior tergites. Tergites 3–6 are narrower than the abdomen. Tergite 7 undivided, narrower posteriorly, with a marginal row of long setae in the lateral parts of the posterior margin and 1–3 short setae laterally near the margin. Anal segment short, conical, with a transverse row of setae on the surface. Spiracles 3, 4 and 5 at the anterior lateral corners of the respective sternites. Spiracle 6 placed in the membrane near the posterior lateral corner of sternite 5 and spiracle 7 in a similar position on sternite 6. Sternite 1 + 2 rectangular, with a ctenidium of 58 very long, thin, seta-like spines in 4 specimens and in one 4–5 short, thick spines within the row of long thin spines. The ctenidium does not reach the lateral corners of the sternite but leaves part of the posterior margin free which bears a row of ordinary setae. Surface covered with short setae except for a few bare patches. Sternites 3–6 divided in the middle, the sclerites becoming more triangular posteriorly. They are wider than the abdomen and partly cover the pleurae. They have marginal rows of moderately long setae and short setae



Figs. 593, 594. *Herskovitzia inaequalis* n.sp. Female. 593. abdomen, dorsal; 594. same, ventral, with genital plate.

on the surface. Sternite 7 triangular, undivided, with rounded anterior margin. Sternite 7 has 3 more heavily pigmented areas which do not bear any setae, a triangular area in the middle and 2 deeply concave areas laterally which connect sternite 7 with the posterior margin of sternite 6. Post-spiracular sclerite small, with 2-3 setae. Genital plate triangular, with 2-5 short setae.

PERU. Loreto, from *Thyroptera discifera*, 16.ix. 1957, Maynas, Celestino, Kalinowsky, ♀ holotype, 1 ♂ 4 ♀ paratypes. Chicago Natural History Museum.

#### GENUS *PENICILLIDIA* Kolenati, 1863

*Megistopoda*. Kolenati, 1857 (nec Macquart, 1852), *Wien. Ent. Monatsschr.* 1, 62 [without included species].

*Penicillidia*. Kolenati, 1863. *Hor. Soc. Ent. Ross.* 2, 9. Type species: *Penicillidia conspicua* Speiser, 1901 (= *westwoodii* Kolenati, 1863), by designation of Speiser, 1908, *Zeitschr. wiss. Insectenbiol.* 4, 438.

Medium-sized or large insects, 2.5-5 mm., generally very setose. Head rounded posteriorly, not compressed laterally, with single unpigmented eyes. Several rows of setae between the eyes.



Palps wide, with several rows of setae ventrally and a long terminal seta. Thorax wider than long. Mesonotum wide, notopleural sutures converging posteriorly. Notopleural setae present or absent. Haltere groove covered. Oblique sutures of the sternal plate of the thorax fused. Thoracic ctenidium with narrow pointed spines, absent in one subgenus. Legs long, with slender tibiae without marked rings and with several rows of setae in the distal part of the ventral margin. Abdominal ctenidium either normally developed, reduced or absent. Postspiracular sclerite absent. 2 or 3 tergal plates on the female abdomen, sternites 5 and 6 with sclerotized plates or produced into processes. Dorsal and ventral genital plates present. Dorsal plate generally forming a lip which covers the genital opening from above. Abdomen of the male with normal segmentation or with tergites 1 and 2 fused in some species. Sternite 5 with an armature of spines. Genitalia of *Nycteribia* type, aedeagus generally curved, with ventral scale-like teeth (except *P. dufourii*) and a dorsal tooth near the end in some species.

Distribution: Throughout the Old World. 17 species.

The first attempt at a sub-division of the genus was made by Speiser in 1908. He divided the genus into 4 subgenera as follows:

1. *Penicillidia* s.str. Type: *P. conspicua* Speiser (= *westwoodii* (Kolenati)).
2. *Camptopenicillidia*. Type: *P. jenynsii* (Westwood).
3. *Cratopenicillidia*. Type: *P. senegalensis* Gervais.
4. *Stylophenicillidia*. Type: *P. dufourii* (Westwood).

Speiser designated *P. conspicua* as the type species of the typical subgenus and thus of the genus. (In some later publications *P. dufourii* has been considered erroneously as genotype (Theodor & Moscona, 1954, and Grulich & Povolny, 1955).) The above classification separates *P. conspicua* and *P. dufourii* on the basis of characters which have proved to be only of specific rank. It uses *P. senegalensis*, a nomen nudum, as type for another subgenus, which, however, recognizes the group of the large African species. It creates a separate subgenus for *P. jenynsii* based on the curvature of the sternal plate of the thorax, while the other character used, the well-developed abdominal ctenidium, has also proved to be of only specific value. Finally, in this classification species were considered as belonging to the genus *Penicillidia* which are now known to belong to other genera (*Stylidia euxesta*, *Basilia mexicana*).

Grulich & Povolny (1955) created the subgenus *Neopenicillidia* for *P. conspicua*. This is inadmissible since the type of the genus and of the typical subgenus have to be the same species.

In the present classification, only *Eremoctenia* is considered as a subgenus and the other species are arranged in groups of the subgenus *Penicillidia* s.str. as follows:

1. *conspicua* group. Tergal plate 3 of the female abdomen absent. Sternites 5 and 6 of the female abdomen strongly curved and produced into lateral processes which are directed posteriorly. Sternite 5 of the male either with 3 groups of spines, of which the lateral groups are placed on processes, or triangularly produced posteriorly with groups of spines along the sides of the triangle. Length 3.5–4 mm. Palearctic.

2. *fulvida* group. Very large insects, 4–5 mm. Tergal plate 3 of the female abdomen either well developed, reduced or absent. Sternites 5 and 6 with sclerotized plates, not produced into lateral processes. Sternite 5 of the male with straight or slightly conical posterior margin, with



a single group of spines. Sternal plate of the thorax only slightly curved in the longitudinal direction. Ethiopian Region and Madagascar.

3. *jenynsii* group. Smaller insects, 3.5 mm. or less. Sternal plate of the thorax strongly curved in the longitudinal direction. Tergites 1 and 2 of the male abdomen fused except in *P. leptothrinax*. Sternite 5 of the male with straight, curved or triangularly produced posterior margin, with a group of spines which may be divided by a small gap in the middle. Tergal plate 3 of the female abdomen always present. Sternites 5 and 6 of the female abdomen with sclerotized plates, without lateral processes. Oriental and Pacific Region, one species in Madagascar.

#### KEY TO THE SUBGENERA AND GROUPS OF *PENICILLIDIA*

1. Thoracic and abdominal ctenidia absent. **Subgenus Eremoctenia** (p. 397)  
 Thoracic ctenidium always present, abdominal ctenidium either well developed, reduced or absent. **Subgenus Penicillidia** (p. 358) **2**
2. Tergal plate 3 of female abdomen absent. Sternites 5 and 6 of the female abdomen produced into processes which are directed posteriorly. Sternite 5 of the male with either 3 groups of spines, of which the 2 lateral ones are placed on processes, or strongly produced posteriorly, forming a triangle with the apex posteriorly and rows of spines at the sides.  
**conspicua group of the subgenus Penicillidia** (p. 358)  
 Tergal plate 3 of the female abdomen present in most species, reduced in one species, absent in another. Sternites 5 and 6 not produced into posterior processes. Sternite 5 of the male abdomen with straight or slightly convex posterior margin, in one species triangularly produced posteriorly, generally with one group of spines at the posterior margin. This group may be divided by a small gap in the middle. **3**
3. Very large, setose insects, 4–5 mm. Sternal plate of the thorax only slightly convex in the longitudinal direction. Ethiopian Region and Madagascar.  
**fulvida group of the subgenus Penicillidia** (p. 368)  
 Smaller, less setose insects, 2.5–3.5 mm. Sternal plate of the thorax strongly convex in the longitudinal direction. Tergites 1 and 2 of the male fused, except in *P. leptothrinax*. Oriental and Pacific Region. One species in Madagascar.  
**jenynsii group of the subgenus Penicillidia** (p. 374)

#### KEY TO THE SPECIES OF THE GENUS *PENICILLIDIA*

##### MALES

1. Thoracic and abdominal ctenidium absent. Eyes rudimentary. Sternite 5 with a group of about 25 spines in 4–5 rows on a median process of the posterior margin. Moluccas (Figs. 677, 680, 681).  
**P. (E.) progressa** (p. 398)
- Thoracic and abdominal ctenidia present. Eyes well developed as a single unpigmented lens. **2**
2. Very large, broadly built and setose insects, 4–5 mm. **3**  
 Smaller, less setose insects, 4 mm. or less. **4**
3. Notopleural setae absent. Femora 2 and 3 with long setae only in the distal part of the anterior surface. Setae of the distal row on the tibiae longer than the width of the tibia. Sternite 5 with a group of 40–50 spines in a double row. Africa (Figs. 612, 613). **P. fulvida** (p. 368)  
 Notopleural setae absent. Femora 2 and 3 covered with moderately long setae on the whole anterior surface. Setae of the distal row on the tibiae not longer than the width of the tibia. Sternite 5 with a group of about 65 spines in 3 rows. Africa (Figs. 620–623).  
**P. pachymela** (p. 370)

4. Sternite 5 with two lateral broad, rounded processes which are covered with numerous short, thick spines and with a median group of spines between the lateral processes. 4-8 notopleural setae. Western Palaearctic to the Himalayas (Figs. 604, 605). **P. dufourii** (p. 362)  
 As *P. dufourii*, but lateral plates of the notopleural sutures wider, 8-12 notopleural setae, and parameres longer and more slender. China, Japan, Formosa. **P. dufourii tainani** (p. 367)  
 As *P. dufourii*, but frons prolonged into a long horn. Europe (Fig. 11). **P. monoceros** (p. 367)  
 Sternite 5 different. 5
5. Sternite 5 triangularly produced in the middle of the posterior margin. 6  
 Sternite 5 with straight or rounded posterior margin 7
6. Length 3.5-4 mm. 3-6 long notopleural setae. Sternal plate of the thorax flat. Tergites 1 and 2 not fused. Very long setae on tergites 3-6. Posterior angle of sternite 5 pronounced. About 15 spines in 1-2 rows at each side of the posterior margin. Apex of the triangle bare. Surface of the sternite bare except for groups of setae at the lateral corners. Aedeagus with an apical dorsal tooth. Europe, North Africa, West Asia (Figs. 595-598). **P. conspicua** (p. 358)  
 Length 3.5 mm. Notopleural setae absent. Sternal plate of the thorax strongly convex in the longitudinal direction. Tergites 1 and 2 fused. Long setae on tergites 4-6. Sternite 5 less strongly produced posteriorly, with rounded apex. About 20 spines in 2 rows at the apex and on the posterior margin near it. The lateral spines longer than those at the apex. Surface covered with setae in the middle, leaving a narrow median strip bare. India, Ceylon (Figs. 639, 640). **P. indica** (p. 379)
7. Notopleural setae present 8  
 Notopleural setae absent. 12
8. Larger species, 3.5 mm. 1-3 long notopleural setae. Sternite 5 with a group of 25-30 spines in 2 rows. Aedeagus curved, with a dorsal apical tooth. Parameres slender, parallel-sided, with a rounded end. Aedeagus with ventral scales up to the tip. Burma (Figs. 634, 635). **P. heinrichi** (p. 377)  
 As *P. heinrichi*, but ventral scales on the aedeagus only in the basal two-thirds. Thailand (Figs. 636, 638). **P. actedona** (p. 379)  
 Smaller species, up to 3 mm. Parameres triangular, pointed at tip. 9
9. Abdominal ctenidium well developed, with more than 30 spines. 2-3 notopleural setae or spines. 10  
 Abdominal ctenidium much reduced, only 12-16 short spines between setae, spines very small or absent in the middle. 5-9 notopleural setae. 11
10. 2-3 very short notopleural spines, rarely a hair. Tergites 1 and 2 fused. Abdominal ctenidium with 30-32 spines which are smaller and more widely spaced in the middle. Sternite 5 with rounded posterior margin and a small median concavity. About 20 spines in 2 rows at the posterior margin, divided into 2 groups at both sides of the median concavity which is bare. The lateral spines are longer than the median ones. Aedeagus curved, with a dorsal apical tooth. China, Japan, Formosa (Figs. 643, 647, 648). **P. jenyinsii** (p. 382)  
 2-3 short, thin notopleural setae which are absent in some specimens (see no. 12). Tergites 1 and 2 not fused. Tergite 1 with a marginal row of 10-12 setae. Abdominal ctenidium with 40 closely placed spines of uniform size. Sternite 5 with straight posterior margin with a group of 25-28 spines in 2 rows, 18 longer spines in the posterior row and 8-10 shorter spines in the anterior row. Aedeagus with rounded tip and a sub-apical dorsal tooth. Madagascar (Figs. 653, 654). **P. leptothrinax** (p. 385)
11. 5-6 notopleural setae, rarely 7 or 8. Sternite 5 with a triangular group of 25-30 spines in 3 rows which are generally longer than the spines of the abdominal ctenidium. Aedeagus only little wider at the base than in the apical part. New Hebrides (Figs. 630, 631). **P. buxtoni** (p. 374)  
 7-8 notopleural setae, rarely 6 or 9. Sternite 5 with a group of 16-20 spines in a double row, which may be single in the middle. Aedeagus twice as wide at the base as in the apical part. Solomon Islands (Figs. 675, 676). **P. spinifera** (p. 395)



12. Notopleural setae absent. Tergites 1 and 2 not fused. Tergite 1 with 10-12 marginal setae. Abdominal ctenidium with about 40 closely placed spines of uniform size. Sternite 5 with a posterior row of about 18 longer spines and an anterior row of 8-10 shorter spines. Aedeagus with rounded tip and dorsal sub-apical tooth. Madagascar (Figs. 653, 654). **P. leptothrinax** (p. 385)  
Tergites 1 and 2 fused. Abdominal ctenidium reduced, with smaller, more widely spaced spines in the middle. 13
13. Large species, length 3.5 mm. Tergites 3-6 with marginal rows of 15-25 very long and strong setae. Surface of sternites 3 and 4 covered with short hairs. Sternite 5 with a group of about 35 spines in 2 rows, the lateral spines longer than the median ones. Solomon Islands (Figs. 656-658). **P. miriamae** (p. 387)  
Smaller species, length 2.5, rarely 3 mm. Tergites 3-6 with only 6-10 very long setae in the middle of the marginal rows. Sternites 3 and 4 bare on the surface. 14
14. Ventral anterior margin of the head with 2 rows of hairs. Abdominal ctenidium with 30-40 spines. Sternite 5 with a group of about 25-30 spines in 2 rows. Aedeagus curved, with a large dorsal tooth, parallel-sided in dorsal view, with scales in the basal two-thirds. Philippines, Sumatra (Figs. 669, 672, 673). **P. oligacantha** (p. 393)  
Only one row of short hairs at the ventral anterior margin of the head. Abdominal ctenidium with only about 20 spines, the median spines much smaller and with a gap in the middle. Sternite 5 with a group of 20-25 spines in 2 rows. Aedeagus curved, without apical tooth, triangular in dorsal view, tapering to a blunt point, with a small group of scales in the basal third. New Caledonia, Australia (Figs. 661-663, 665, 666, 668). **P. oceanica** (p. 389)  
Larger, darker, more setose. Aedeagus longer, more strongly curved. Philippines (Figs. 664, 667, 670). **P. oceanica acuminata** (p. 392)  
The male of *P. decipiens* is unknown.

FEMALES

1. Thoracic and abdominal ctenidium absent. Eyes rudimentary. Tergite 1 with 10-15 long setae in the middle of the posterior margin and shorter setae laterally. Tergal plate 3 triangular, close to the anal segment. Connexivum between tergal plates 2 and 3 bare. Genital plate triangular, small, without setae. Moluccas (Figs. 677-679). **P. (E.) progressa** (p. 398)  
Thoracic ctenidium present. Abdominal ctenidium well developed, reduced or absent. Eyes well developed in most species, with a single unpigmented lens. 2
2. Very large, broadly built, setose insects, 4-5 mm. 3  
Smaller insects, 4 mm. or less. 5
3. 5-6 very long notopleural setae present. Tergite 1 with a marginal row of short setae with a gap in the middle. Tergal plate 3 absent. Connexivum between tergal plate 2 and anal segment bare. Anal segment very large. Genital plate rounded, with a row of 10 long setae at the base. Madagascar (Figs. 614-616). **P. decipiens** (p. 370)  
Notopleural setae absent. Tergal plate 3 present or indicated by groups of setae. Tergite 1 with a marginal row of long setae. 4
4. Femora 2 and 3 with long setae only in the distal third of the anterior surface. Setae of the distal row on the tibiae longer than the width of the tibia. Sternite 1 + 2 with a ctenidium of about 50 very short, widely spaced spines. Connexivum between tergal plates 2 and 3 and between tergal plate 3 and the anal segment bare. Tergal plate 3 wide, undivided. Genital plate rounded, with a double row of 12-15 setae at the base. Africa (Figs. 609-611, 625). **P. fulvida** (p. 368)  
Femora 2 and 3 with setae on the whole anterior surface. Setae of the distal row on the tibiae not longer than the width of the tibia. Sternite 1 + 2 with a ctenidium of about 40 spines. Tergal plate 2 covered with short hairs on the greater part of the surface. Tergal plate 3 either represented by narrow lateral sclerites covered with setae or by groups of setae. A row of long setae between tergal plates 2 and 3 and a varying number of short hairs. Genital plate rounded, with 2 setae near the base and a second row of short setae which may be absent. Africa (Figs. 617-619, 624). **P. pachymela** (p. 370)



5. Sternites 5 and 6 narrow, strongly curved, so that the lateral processes point posteriorly. 6  
Sternites 5 and 6 not curved, without processes. 7
6. Tergite 1 triangular, with a few short spines at the apex. Tergal plate 2 large, rounded, with a marginal row of about 20 long setae and covered with short hairs on the surface. Tergal plate 3 absent, connexivum between tergal plate 2 and the anal segment bare. Sternite 1 + 2 rounded laterally, with a ctenidium of 30–35 spines. Genital plate with an angular row of 10–14 setae. West Palaearctic (Figs. 599–602). **P. conspicua** (p. 358)  
Tergite 1 rounded posteriorly, with a row of short, thick setae with a gap in the middle. Tergal plate 2 rectangular, bare on the surface, with 2 groups of long spines at the posterior margin. Two sclerotized processes with a sharp posterior edge on the connexivum behind tergal plate 2. Abdominal ctenidium with 40–44 closely standing spines of uniform size. Genital plate small, rounded, with 6–8 setae. Western Palaearctic to the Himalayas (Figs. 606, 608). **P. dufourii** (p. 362)  
As *P. dufourii*, but lateral plates of the notopleural sutures wider, 8–12 notopleural setae and genital plate larger, with 12 longer setae. China, Japan, Formosa (Fig. 607). **P. dufourii tainani** (p. 367)  
As *P. dufourii*, but frons prolonged into a long horn. Europe (Fig. 11). **P. monoceros** (p. 367)
7. Notopleural setae absent. 8  
Notopleural setae present. 12
8. Tergal plate 3 completely or incompletely divided into lateral sclerites. 9  
Tergal plate 3 undivided. 11
9. Sternite 1 + 2 nearly rectangular, with a ctenidium of 50–60 spines of uniform size. Tergal plate 2 with a marginal row of about 20 long setae alternating with 1–2 short, thick setae. Surface with short hairs in the middle posteriorly. Genital plate rounded, with 4 setae at the base. India, Ceylon (Fig. 641). **P. indica** (p. 379)  
Sternite 1 + 2 trapezoidal, with a reduced ctenidium of 20–25 short spines between setae, the median spines smaller and more widely spaced. 10
10. Small species, length 2.5–3 mm. Tergite 1 with 1–2 short setae, which may be absent, in the middle of the posterior margin. Tergal plate 2 with only 4–6 long setae in the middle of the marginal row and shorter setae laterally. Pleurae with only a small group of short setae anteriorly. Philippines, Sumatra (Figs. 644, 671). **P. oligacantha** (p. 393)  
Larger species, length 3.5 mm. Tergite 1 with a double row of about 12 moderately long setae on the surface near the middle of the posterior margin. Tergal plate 2 with a marginal row of 35–40 very long setae. Pleurae covered with strong short setae and spines. Solomon Islands (Fig. 655). **P. miriamae** (p. 387)
11. Lighter coloured, less setose insects. Tergite 1 with 8–10 setae in the middle of the posterior margin. Tergal plate 2 with several long setae in the middle of the marginal row which are shorter than in *P. oceanica acuminata*. Abdominal ctenidium with only 4–5 short spines at each side of the posterior margin of sternite 1 + 2 and setae between the spines and in the middle. New Caledonia, Australia (Figs. 659, 660). **P. oceanica** (p. 389)  
Darker, more setose insects. Tergite 1 with 6–8 setae at the posterior margin. Tergal plate 2 with 2 groups of 3–4 very long setae in the middle of the marginal row, and some short spines or setae between the two groups. Abdominal ctenidium with 12–14 spines. Philippines. **P. oceanica acuminata** (p. 392)
12. Tergal plate 3 divided into lateral sclerites 13  
Tergal plate 3 undivided. 15
13. 2–3 short, thin notopleural setae. Tergite 1 wider than long, with a marginal row of 12–20 setae. Tergal plate 2 with a marginal row of about 20 long setae alternating with short setae. Abdominal ctenidium with about 50 closely placed spines of uniform size. Genital plate large, rounded, with a row of 10 setae at the base. Madagascar (Figs. 649–652). **P. leptothrinax** (p. 385)

- 5-12 long notopleural setae. Ctenidium very much reduced, consisting of only 3-4 very short spines between setae at each side of the posterior margin of sternite 1 + 2. 14
14. 5-6, rarely 7 or 8 notopleural setae. Tergite 1 longer than wide, with 2-4 moderately long setae posteriorly. Tergal plate 2 with 6-8 long setae in the middle of the marginal row and shorter setae laterally. Surface with short setae on the lateral parts. New Hebrides (Figs. 626-629).  
**P. buxtoni** (p. 374)
- 9-12 notopleural setae. Tergite 1 as long as wide, with 4-5 short setae posteriorly. Tergal plate 2 with a marginal row which consists of long spines only in the middle and 1-2 moderately long setae at the lateral posterior corners. Surface usually bare. Solomon Islands (Fig. 674).  
**P. spinifera** (p. 395)
15. Length 3 mm. Tergite 1 rounded posteriorly, with 6-8 moderately long setae in the middle of the posterior margin. Tergal plate 2 with a row of long and short setae in the marginal row. Abdominal ctenidium with about 30 widely spaced spines, the median spines smaller. Genital plate very small, triangular, without setae at the base. China, Japan, Formosa (Figs. 645, 646).  
**P. jenynsii** (p. 382)
- Length 3.5 mm. Tergite 1 rectangular, with a row of widely spaced, short setae at the posterior margin. Tergal plate 2 with long setae in the middle of the marginal row, shorter setae laterally and a gap in the middle of the row. Abdominal ctenidium much reduced, only 4-5 spines at each side of the posterior margin. Genital plate as long as wide between the basal setae, rounded posteriorly. Burma (Figs. 632, 633).  
**P. heinrichi** (p. 377)
- As *P. heinrichi*, but sternite 1 + 2 without ctenidium, with only longer and shorter setae at the posterior margin. Genital plate shorter than wide between the basal setae. Thailand (Fig. 637)  
**P. actedona** (p. 379)

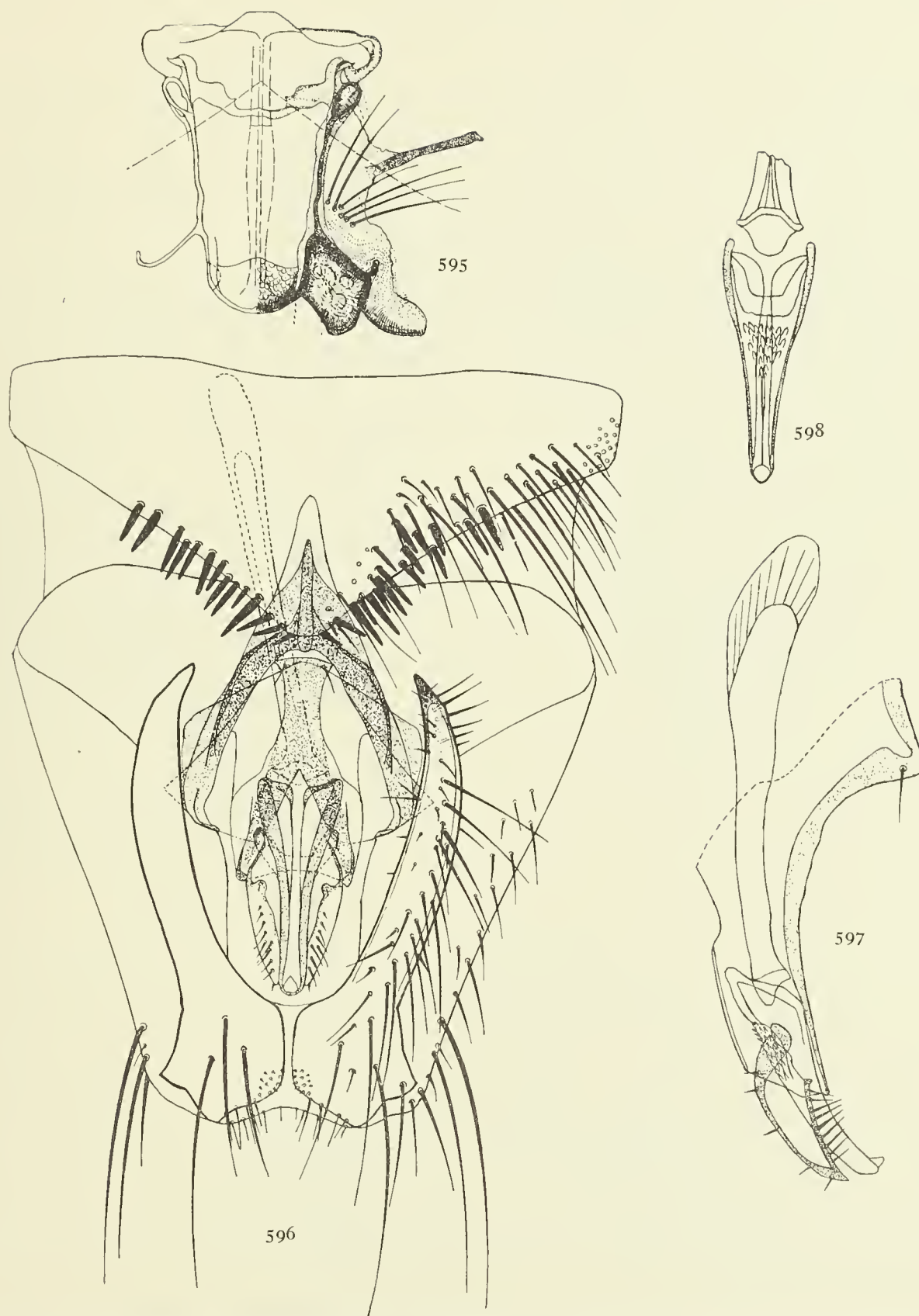
SUBGENUS **PENICILLIDIA** Kolenati, 1863

**CONSPICUA** GROUP

**Penicillidia conspicua** Speiser, 1901

(Figs. 595-602)

- Nycteribia westwoodii*. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.  
nec *Nycteribia westwoodii*. Guérin Ménéville, 1844, *Iconogr.* **3**, 556.  
*Megistopoda westwoodii* Kolenati. Kolenati, 1857, *Wien. Ent. Monatsschr.* **1**, 65.  
*Penicillidia westwoodii* Kolenati. Kolenati, 1863, *Hor. Ent. Soc. Ross.* **2**, 9.  
*Nycteribia westwoodii* Kolenati. Rondani, 1879, *Bull. Soc. Ent. Ital.* **11**, 3.  
*Penicillidia conspicua*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11 (*nomen novum*).  
*Penicillidia conspicua* Speiser. Speiser, 1908, *Zeitschr. wiss. Insektenbiol.* **4**, 241, 301, 420, 437.  
*Penicillidia conspicua* Speiser. Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 522.  
*Penicillidia conspicua* Speiser. Falcoz, 1924, *Bull. Mus. Hist. Nat. Paris*, **30**, 223.  
*Penicillidia conspicua* Speiser. Falcoz, 1926, *Dipt. Pupipares, Faune de France*, **14**, Paris.  
*Penicillidia conspicua* Speiser. Gil Collado, 1932, *Eos*, **8**, 29.  
*Penicillidia conspicua* Speiser. Corradetti, 1934, *Riv. Malar.* **13**, 338.  
*Penicillidia conspicua* Speiser. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, **17**, 9.  
*Penicillidia conspicua* Speiser. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.  
*Penicillidia conspicua* Speiser. Stefanelli, 1942, *Riv. Parassit.* **6**, 25, 61.  
*Penicillidia conspicua* Speiser. Saccà & Bettini, 1949, *Riv. Parassit.* **10**, no. 1.  
*Penicillidia conspicua* Speiser. Stefanelli, 1949, *Rend. Fac. Sci. Cagliari*, p. 181.  
*Penicillidia conspicua* Speiser. Leclercq & Theodorides, 1950, *Ent. Monthl. Mag.* **86**, 74.  
*Penicillidia conspicua* Speiser. Aellen, 1952, *Bull. Soc. Sci. nat. phys. Maroc*, **31**, 149.  
*Penicillidia conspicua* Speiser. Aellen, 1955, *Bull. Soc. Neuchâtel Sci. Nat.* **78**, 81.  
*Penicillidia conspicua* Speiser. Ricci, 1953, *Riv. Parassit.* **14**, 219.  
*Penicillidia conspicua* Speiser. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.  
*Penicillidia conspicua* Speiser. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 34.  
*Penicillidia (Neopenicillidia) conspicua* Speiser. Grulich & Povolny, 1955, *Fol. Zool. Ent.* **4**, 111.



Figs. 595-598. *Penicillidia conspicua* Speiser. 595. dorsal pattern of thorax; 596. male sternite 5 and genital area; 597. male genitalia, profile; 598. aedeagus, dorsal.



*Penicillidia conspicua* Speiser. Balcells, 1956, *Speleon*, 6, 287.

*Penicillidia conspicua* Speiser. Aellen, 1959, *Rev. Suisse Zool.* 66, 555.

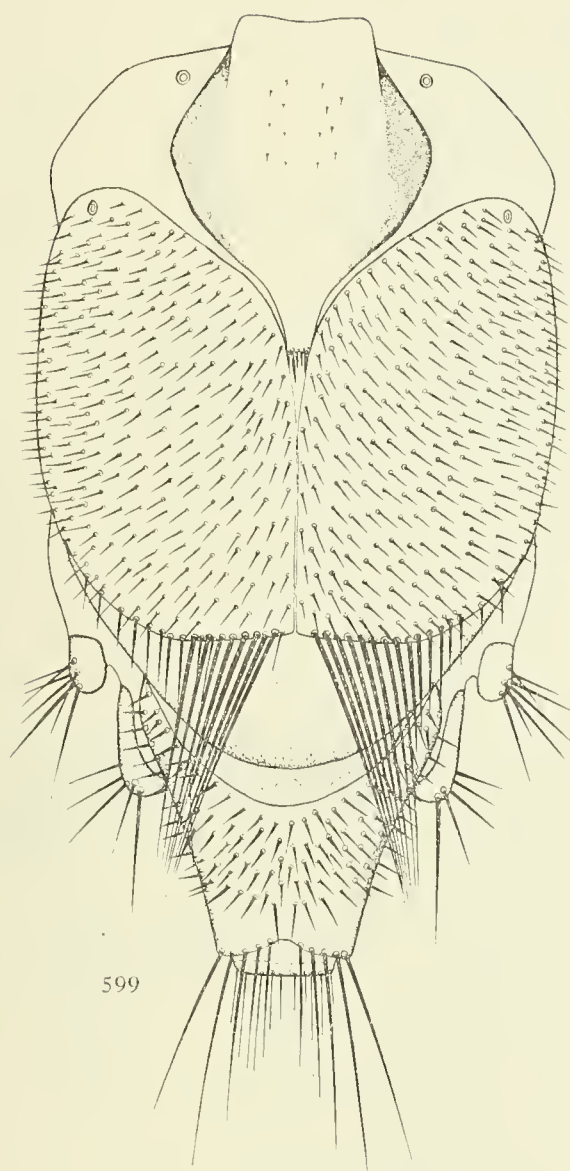
Length 3.5–4 mm. Colour brown. Head with 4–5 rows of setae between the eyes. Labella of the proboscis shorter than the theca.

*Thorax.* Length to width = 3 : 4. Mesonotum wide, 3–6 notopleural setae. Mesopleural suture long and narrow. Lateral plates of the notopleural sutures wide. Median sternal suture narrow, well marked. Oblique sutures forming an angle of 110°.

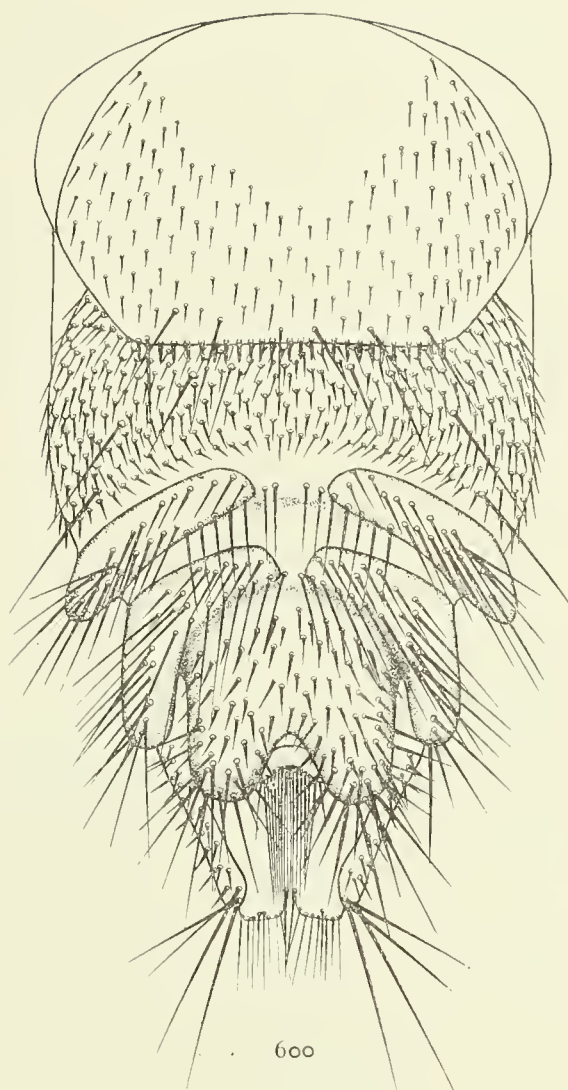
*Male abdomen.* Tergite 1 indistinctly divided from tergite 2, with rounded posterior margin which bears a few minute hairs. Tergite 2 with rounded posterior margin and a dense marginal row of long and short setae. Tergites 3–6 with marginal rows of very long and shorter setae, particularly 2–4 very long setae in the middle of the rows. Tergite 3 long, tergite 4 shorter, tergites 5 and 6 very short, strongly convex posteriorly. Surface of tergites 2–5 covered with short hairs, tergite 6 bare on the greater part of the surface. Anal segment truncate conical, with deeply concave anterior dorsal margin, with short setae on the dorsal surface and long setae posteriorly. Sternite 1 + 2 rectangular, with a ctenidium of about 40 ordinary spines which are shorter in the middle. The spines are more widely spaced than in *P. dufourii*. Surface covered with short setae which are longer laterally and with a premarginal row of long setae. Sternite 3 with a marginal row of short setae and with short setae on the surface. Sternite 4 shorter than sternite 3, with concave posterior margin, with a marginal row of short setae in the middle and longer setae laterally. Only a few short setae on the surface laterally and a long premarginal seta at each side. Sternite 5 triangular with the apex posteriorly, surface bare, except for 3–4 rows of setae at the lateral angles. The posterior margins each with a group of about 15 strong spines which are longer laterally, leaving the apex bare.

*Genitalia.* Basal arc triangular, with a long anterior process and small lateral flanges. Aedeagus curved, with a blunt dorsal tooth at the tip, tapering to a blunt point and with scale-like teeth in the basal part. Apodeme long, with a wide end-plate. Parameres narrow, triangular, with curved ventral margin and a sharp apical end. About 10 short setae at the dorsal margin.

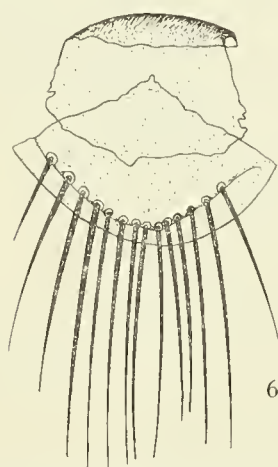
*Female abdomen.* Tergite 1 triangular, with 2–6 short spines at the apex, wedged into the large tergal plate 2. This is rounded posteriorly, incompletely divided in the middle and bears a row of 15–20 long, closely placed setae in the middle of the posterior margin and shorter, more widely spaced setae laterally. The whole surface is covered with short hairs. Tergal plate 3 absent. Anal segment conical, truncate, with concave or angular anterior dorsal margin and long setae posteriorly. Dorsal surface covered with short setae. Sternite 1 + 2 longer than in the male, rounded at the sides and with a ctenidium of 30–35 widely spaced, ordinary spines. A row of 6–10 long premarginal setae and several rows of short setae on the surface. Sternites 3 and 4 membranous, with short setae on the surface and marginal rows of short setae, 6 long vertical setae on sternite 3, only one such seta at each side of sternite 4. Sternites 5 and 6 narrow, curved, divided into lateral sclerites. The sides of the sternites are prolonged into lobes which point posteriorly and bear thick brushes of long setae. The sclerites have double marginal rows of long setae and shorter setae on the surface. Sternite 7 with two posterior lobes which also bear brushes of long setae and shorter setae on the surface. Dorsal genital plate wide,



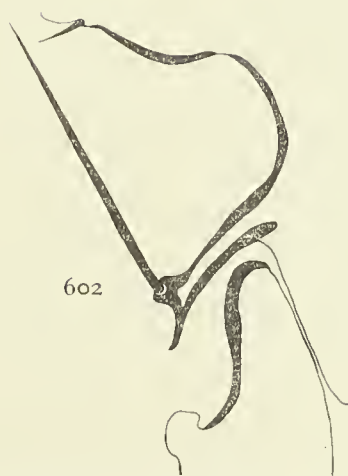
599



600



601



602

Figs. 599-602. *Penicillidia conspicua* Speiser. 599. female abdomen, dorsal; 600. same, ventral; 601. genital plates; 602. sagittal section through the genital area.



triangular, with rounded posterior margin and a row of 10–14 long setae near the edge. Ventral genital plate wide, with a rounded anterior margin.

Distribution: Southern Europe, North Africa, West Asia.

MATERIAL IN THE COLLECTION

*Nycteribia westwoodii*, don. Kolenati, 1 ♂ (Brit. Mus. 1856.163).

FRANCE

Seine, from *Miniopterus schreibersi*, Mar. 1879, pres. N. C. Rothschild, 3 ♂ 4 ♀.

Hérault, from *Rhinolophus* sp., Dec. 1926, N. C. Rothschild, 2 ♂ 1 ♀.

St Génies de Malgoires, Gard, from *Miniopterus schreibersi*, A. Hugues, N. C. Rothschild, 25.iii. 1911, 1 ♀; Dec. 1911, 1 ♂ 4 ♀; 8.iv. 1923, 2 ♂ 4 ♀; Oct. 1926, 2 ♀.

St Génies de Malgoires, Gard, from *Vespertilio murinus*, A. Hugues, N. C. Rothschild, 25.iii. 1911, 2 ♂ 2 ♀; 12.iv. 1923, 3 ♀.

St Génies de Malgoires, Gard, from *Myotis capaccinii*, 1926, A. Hugues, N. C. Rothschild, 3 ♂.

St Génies de Malgoires, Gard, from *Rhinolophus euryale*, Mar. 1932, A. Hugues, 1 ♂ 2 ♀ (Brit. Mus. 1933.263).

St Génies de Malgoires, Gard, from *Rhinolophus ferrumequinum*, Apr. 1910, A. Hugues, N. C. Rothschild, 1 ♂ 1 ♀; Mar. 1932, A. Hugues, 2 ♂ 1 ♀ (Brit. Mus. 1933.263).

ITALY

Toscana, from *Rhinolophus ferrumequinum*, 1915, N. Cimbali, N. C. Rothschild, 1 ♂.

GERMANY

Taucha near Leipzig, from bat, 1913, O. Fritsche, N. C. Rothschild, 2 ♀.

BULGARIA

Karamleh, Strandja, from *Nyctalus* sp., 31.vii. 1925, G. Heinrich, 2 ♂ 6 ♀ (Brit. Mus. 1946.288).

RUMANIA

Malcoci, from *Plecotus auritus*, 17.i. 1908, A. Rettig, N. C. Rothschild, 3 ♂ 2 ♀.

Malcoci, from *Rhinolophus ferrumequinum*, 17.i. 1908, A. Rettig, N. C. Rothschild, 1 ♂.

Malcoci, from *Miniopterus schreibersi*, 1914, O. Fritsche, N. C. Rothschild, 1 ♀.

Cavarje, from *Miniopterus schreibersi*, 20.x. 1912, A. Rettig, N. C. Rothschild, 4 ♂ 13 ♀.

Cavarje, from *Rhinolophus ferrumequinum*, 20.x. 1912, A. Rettig, N. C. Rothschild, 2 ♂ 2 ♀.

CORSICA

Ajaccio, S. Hirst, 1 ♀ (Brit. Mus. 1932.487).

ALGERIA

Sidi Okba, near Biskra, from *Miniopterus schreibersi*, 1.iii. 1911, E. Hartert, C. Hilgert, pres. W. Rothschild, 1 ♂.

ISRAEL

Rosh Pinna, from *Miniopterus schreibersi*, 20.ix. 1946, O. Theodor, 1 ♂ 1 ♀ (Brit. Mus. 1947.146).

***Penicillidia dufourii dufourii* (Westwood, 1835)**

(Figs. 603–606, 608)

*Nycteribia vespertilionis*. Dufour, 1831, *Ann. Sciences nat. Paris*, **22**, 372.

*Nycteribia dufourii*. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275.

*Nycteribia westwoodii*. Guérin Ménéville, 1844, *Iconogr.* **3**, 556.

*Nycteribia frauenfeldii*. Kolenati, 1856, *Verh. Zool.-botan. Ver. Wien*, **6**, 189.

*Nycteribia frauenfeldii* Kolenati. Kolenati, 1856, *Parasiten. d. Chiropteren*, Bruenn.

*Megistopoda dufourii* Westwood. Kolenati, 1857, *Wien. Ent. Montasschr.* **1**, 62.

*Megistopoda leachii*. Kolenati, 1857, *Wien. Ent. Monatsschr.* **1**, 62.

*Penicillidia dufourii* Westwood. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

*Penicillidia leachii*. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

*Nycteribia leachii* Kolenati. Schiner, 1864, *Fauna Austr.* **2**, 653.

*Nycteribia leachii* Kolenati. Rondani, 1879, *Bull. Soc. Ent. Ital.* **11**, 8.

*Penicillidia dufourii* Westwood. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Penicillidia dufourii* Westwood. Speiser, 1908, *Zeitschr. wiss. Insektenbiol.* **4**, 241, 301, 420, 437.

nec *Penicillidia dufourii* Westwood. Scott, 1913, *Arch. Naturgesch.* **79**, 92. (Formosa record, refers to *P. dufourii tainani*.)

*Penicillidia dufourii* Westwood. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Penicillidia dufourii* Westwood. Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 522.

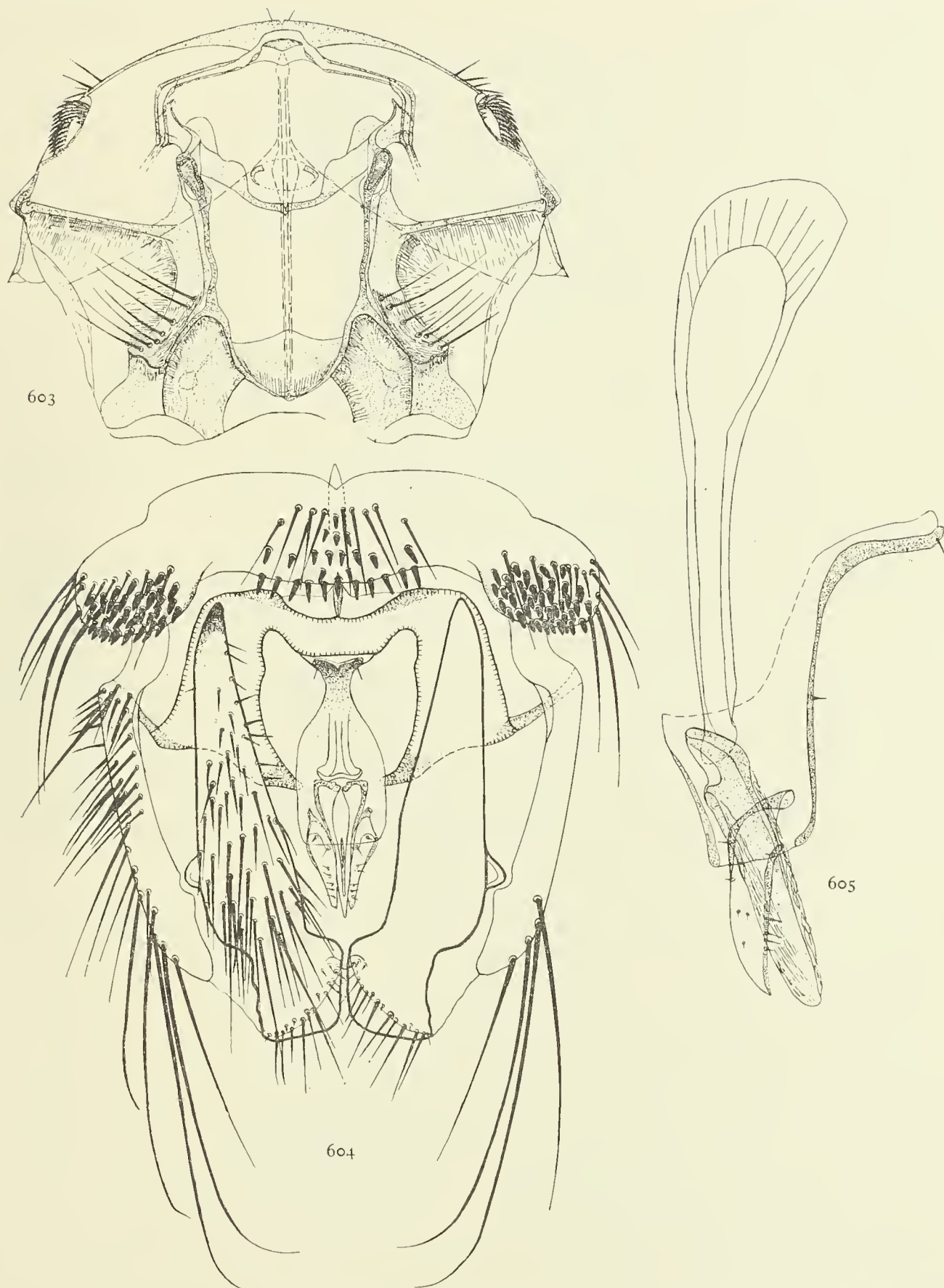
*Penicillidia dufourii* Westwood. Falcoz, 1924, *Bull. Mus. Hist. Nat. Paris*, **30**, 223.

*Penicillidia dufourii* Westwood. Falcoz, 1926, *Faune de France, Dipt. Pupipares*, **14**, Paris.

*Penicillidia dufourii* Westwood. Gil Collado, 1932, *Eos*, **8**, 29.

*Penicillidia dufourii* Westwood. Corradetti, 1934, *Riv. Malar.* **13**, 338.





Figs. 603–605. *Penicillidia dufourii dufourii* (Westwood). 603. thorax, dorsal; 604. male sternite 5 and genital area; 605. male genitalia.

- Penicillidia dufourii* Westwood. Karaman, 1936, *Bull. Soc. Sci. Skoplje*, **17**, 9.  
*Penicillidia dufourii* Westwood. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.  
*Penicillidia dufourii* Westwood. Stefanelli, 1942, *Riv. Parassit.* **6**, 25, 61.  
*Penicillidia dufourii* Westwood. Saccà & Bettini, 1949, *Riv. Parassit.* **10**, no. 1.  
*Penicillidia dufourii* Westwood. Aellen, 1952, *Bull. Soc. Sci. nat. phys. Maroc*, **31**, 149.  
*Penicillidia dufourii* Westwood. Aellen, 1955, *Bull. Soc. Neuchâtel Sci. Nat.* **78**, 81.  
*Penicillidia dufourii* Westwood. Ricci, 1953, *Riv. Parassit.* **14**, 219.  
*Penicillidia dufourii* Westwood. Theodor & Moscona, 1954, *Parasitology*, **44**, 157.  
*Penicillidia dufourii* Westwood. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 36.  
*Penicillidia dufourii* Westwood. Schuurmans Stekhoven, 1955, *Wetenschap. Medel.* **16**, 1.  
*Penicillidia dufourii* Westwood. Grulich & Povolny, 1955, *Fol. Zol. Ent.* **4**, 111.  
*Penicillidia dufourii* Westwood. Balcells, 1956, *Speleon*, **6**, 287.  
*Penicillidia dufourii* Westwood. Hurka, 1958, *Fol. Zool.* **7**, 231.  
*Penicillidia dufourii* Westwood. Aellen, 1959, *Rev. Suisse Zool.* **66**, 555.

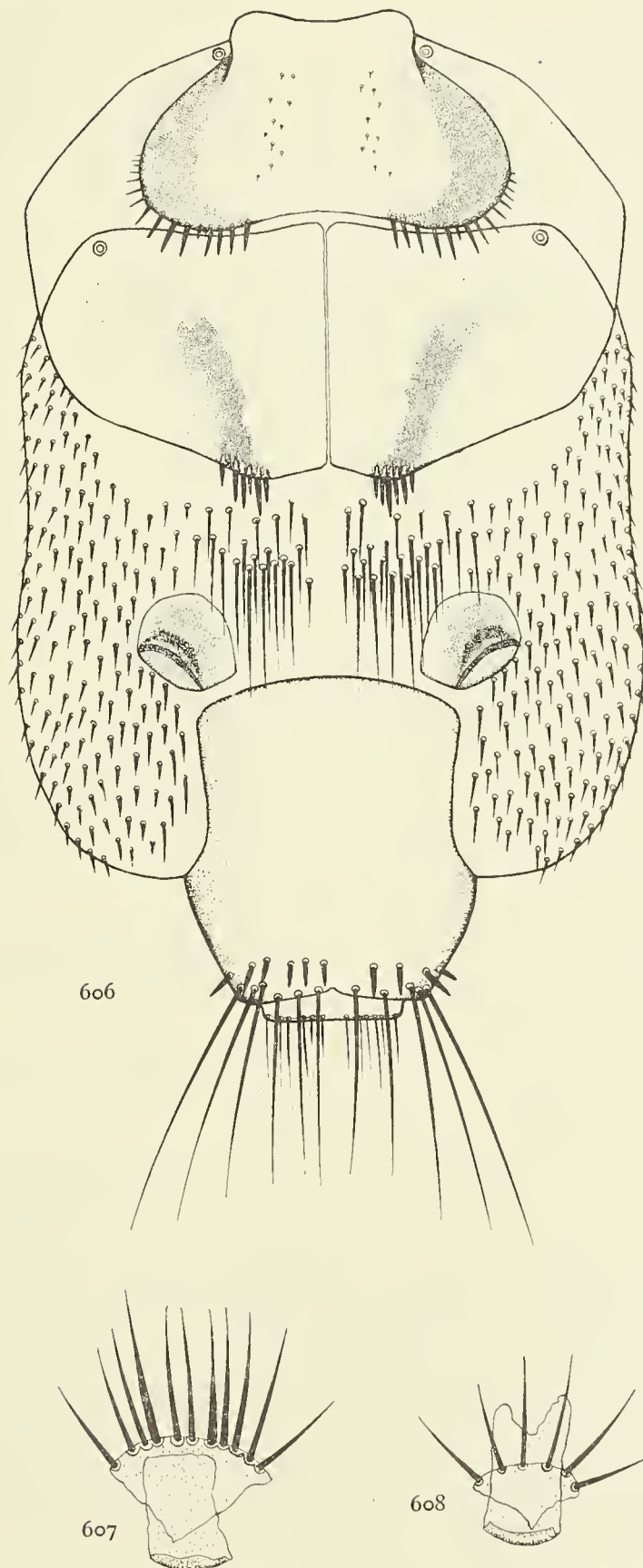
Length 3.5–4 mm. Colour dark brown. Head with 5–6 rows of setae between the eyes. Labella of the proboscis nearly as long as the theca.

*Thorax.* Length to width = 3 : 4. Mesonotum wide, narrowing posteriorly. Lateral plates of the notopleural sutures narrow. 4–8 notopleural setae. Thoracic ctenidium with about 18 spines. Tibiae with 3–4 rows of long setae distally.

*Male abdomen.* Tergite 1 with a marginal row of short setae with a gap in the middle. Tergites 2–4 densely covered with short setae and with a marginal row of longer setae, those of tergite 4 longer than those on tergites 2 and 3. Tergites 5 and 6 bare on the surface and with a double or triple row of very long and strong setae at the posterior margin. The long setae of tergites 4–6 form a thick brush. Anal segment wide and rounded, bare dorsally and with long setae laterally. Very long and curved setae at the posterior margin. Sternite 1 + 2 rectangular, with a ctenidium of 40–44 spines which are placed closer together than in *P. conspicua*. Sternites 3 and 4 with marginal rows of fine, moderately long setae. Surface bare in the middle and with some short setae laterally. Sternite 5 with broad lateral processes with a flat surface which is densely covered with short thick spines. In the middle of the posterior margin of the sternite a triangular group of similar spines with a base of 8–12 spines and with the apex anteriorly. There is a gap between the median group and the spines of the lateral processes.

*Genitalia.* Basal arc nearly square, with broad lateral extensions. Claspers straight, thick, tapering to a blunt, darkly pigmented tip, densely covered with long setae in the basal half of the dorsal surface and with shorter setae further apically. Aedeagus straight, with rounded end and without scales ventrally. Apodeme twice as long as the aedeagus, with a wide end-plate. Parameres narrow, triangular, with sharp apical end and 3–4 short setae at the dorsal edge.

*Female abdomen.* Tergite 1 wide, with a marginal row of short setae with a large gap in the middle. Tergal plate 2 about 3 times as wide as long. It is quite bare on the surface and incompletely divided in the middle. Two groups of 3–9 spines near the middle of the posterior margin. Pigmented stripes run from the groups of spines to the anterior margin of the tergite. Several rows of setae which are longer in the posterior rows, on the connexivum behind tergal plate 2. Posteriorly and laterally to these rows there are 2 sclerotized processes which project backwards. They have a sharp, pigmented posterior edge and a concave posterior surface. They have been interpreted as 'Haftscheiben' by Speiser, that is, as grasping organs, but this seems unlikely and they are probably only remnants of the lateral sclerites of tergal plate 3 which is otherwise



Figs. 606-608. *Penicillidia dufourii dufourii* (Westwood). 606. female abdomen, dorsal; 608. genital plate;  
607. same of *P. dufourii tainani* Karaman.



absent. Connexivum between the sclerotized processes bare. Sides of the dorsum and pleurae covered with short setae. Anal segment large, rounded, bare on the dorsal surface, except for a row of long spines in front of the posterior marginal row of long setae. Sternite 1 + 2 rectangular, with a ctenidium of 40-44 closely placed, flattened spines. Short setae on the surface and a premarginal row of long vertical setae which may be double laterally. Sternites 3 and 4 membranous, covered with short setae and with groups of longer setae at the lateral angles. Sternites 5 and 6 divided into lateral sclerites. They are strongly curved, so that their lateral lobes point backwards. Sternite 7 also prolonged into posterior rounded lobes which are covered with thick groups of setae. Dorsal genital plate small, triangular, with the apex anteriorly. Its rounded posterior margin bears 5-7 setae. Ventral genital plate narrow with a rounded anterior margin and convex posterior surface.

Distribution: Continental Europe, North Africa, West Asia to the Himalayas.

MATERIAL IN THE COLLECTION

From *Miniopterus schreibersi*, 2 ♂ 1 ♀ (Brit. Mus. 1911.103).

PORTUGAL

Monchique, from bat, 12.v. 1910, K. Jordan, N. C. Rothschild, 1 ♀.  
Ribeiro de Alga, near Fort Alva, Barbacena, prov. Alentejo, from *Myotis myotis*, E. Schwarz, 1 ♂ (Brit. Mus. 1935.521).

SPAIN

San Feliu de Guixols, Gerona, from *Myotis blythi oxygnathus*, 23.vii. 1952, D. Harrison, 1 ♀ (Brit. Mus. 1952.434).

FRANCE

Lafaste, South West France, from *Vespertilio murinus*, 1 ♀ (Brit. Mus. 1911.103).  
Rouen, from *Vespertilio murinus*, H. G. Kerville, N. C. Rothschild, 1 ♀.  
St G  n  s de Malgoires, Gard, from *Miniopterus schreibersi*, Dec. 1911, A. Hugues, N. C. Rothschild, 1 ♀.  
H  rault, from *Rhinolophus* sp., Dec. 1926, N. C. Rothschild, 1 ♂.

ITALY

Isola Bella, Lago Maggiore, 16.viii. 1901, N. C. Rothschild, circ. 150 ♂ ♀.  
Bergamo, from *Myotis myotis*, 1.vii. 1911, A. Ghidini, N. C. Rothschild, 4 ♂ 1 ♀.  
Florence, from *Plecotus auritus*, 1915, N. Cimbali, N. C. Rothschild, 2 ♂ 1 ♀.  
Grosseto, from *Miniopterus schreibersi*, 1915, N. Cimbali, N. C. Rothschild, 1 ♂.  
Toscana, from *Vespertilio murinus*, 1915, N. Cimbali, N. C. Rothschild, 2 ♂ 1 ♀.  
Toscana, from *Miniopterus schreibersi*, 1915, N. Cimbali, N. C. Rothschild, 1 ♂.  
Toscana, from *Rhinolophus ferrumequinum*, 1915, N. Cimbali, N. C. Rothschild, 1 ♀.  
Castel Fusano near Ostia, from *Myotis myotis*, 1901, L. W. Sambon, 1 ♂ 1 ♀ (Brit. Mus. 1901.9).

SARDINIA

From *Vespertilio murinus*, T. H. G. Aitken, 1 ♂ 2 ♀.  
Oristano, from *Myotis myotis*, A. H. Krausse, N. C. Rothschild, 3 ♂ 2 ♀.

JUGOSLAVIA

Novi, Croatia, from *Myotis myotis*, 1910, F. Dobiassek, N. C. Rothschild, 2 ♂.  
Novi, Croatia, from *Rhinolophus ferrumequinum*, 1910, F. Dobiassek, N. C. Rothschild, 2 ♂ 3 ♀.  
Vlaspacek cave, Croatia, from bats, 1910, F. Dobiassek, N. C. Rothschild, 8 ♂ 14 ♀.

BULGARIA

Karamleh, Strandja, from *Nyctalus* sp., 31.vii. 1925, G. Heinrich, 1 ♀ (Brit. Mus. 1946.288).

RUMANIA

Cavarje, from *Rhinolophus ferrumequinum*, 20.x. 1912, A. Rettig, N. C. Rothschild, 1 ♀.

MOROCCO

Mazagan, from *Myotis myotis*, 9.vii. 1901, W. Riggensbach, N. C. Rothschild, 3 ♂.

ALGERIA

From *Myotis myotis*, Tmes, 1 ♂ (Brit. Mus. 1857.7);  
Sergent, 1 ♀ (Brit. Mus. 1909.360).  
Djebel Taya, from *Myotis blythi oxygnathus*, 14.ii. 1911, E. Hartert, C. Hilgert, W. Rothschild, pres. N. C. Rothschild, 4 ♀.  
Subterranean lake, Hammam Meskoutine, from *Myotis blythi oxygnathus*, 1.iv. 1913, P. A. Buxton, 1 ♂ 2 ♀.  
Hammam Meskoutine, from *Rhinolophus hipposideros*, May 1914, K. Jordan, W. Rothschild, pres. N. C. Rothschild, about 50 ♂ ♀.

TUNISIA

From *Myotis myotis*, N. C. Rothschild, 1 ♂.  
Djebel Gloub, Khroumirie, from *Rhinolophus euryale*, H. G. Kerville, N. C. Rothschild, 1 ♀.

# NYCTERIBIINAE

# PENICILLIDIA

## ISRAEL

Rosh Pinna, from *Miniopterus schreibersi*, 8.v. 1947,  
O. Theodor, 2 ♂ 2 ♀.

## INDIA

Painsur, near Lohba, Garhwal, West Himalayas,  
from bat, Apr. 1914, Tytler, 1 ♂.

## IRAN

Mt Elburz, from *Myotis myotis*, R. Woosnam, 1 ♂.

## HOST SYNONYMY

Name on original label	Current name
<i>Vespertilio murinus</i> L.	<i>Myotis myotis</i> Borkhausen or
(Records from North Africa and probably from Sardinia)	<i>Myotis blythi oxygnathus</i> Monticelli.

## *Penicillidia dufourii tainani* Karaman, 1939

(Fig. 607)

*Penicillidia dufourii* Westwood. Scott, 1913, *Arch. Naturgesch.* **79**, 92.

*Penicillidia dufourii* Westwood. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479.

*Penicillidia dufourii tainani*. Karaman, 1939, *Bull. Soc. Sci. Skoplje*, **20**, 131.

*Penicillidia tainani* Karaman. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 40.

The subspecies differs from *P. dufourii* as follows: The lateral plates of the notopleural sutures are wider and there are 8–12 notopleural setae which reach further anteriorly than in *P. dufourii*. The dorsal genital plate of the female is wider and bears about 12 longer setae at the posterior margin. The parameres of the male genitalia are more slender, more pointed and nearly as long as the aedeagus.

Distribution: China, Japan, Formosa.

## MATERIAL IN THE COLLECTION

### CHINA

Taian, Shantung, from *Myotis ricketti* or *Rhinolophus ferrumequinum nippon*, 3.vi. 1926, E. Hindle, 1 ♂ 1 ♀.

### FORMOSA

Anping, from *Miniopterus schreibersi*, 26.ix. 1906,  
H. Sauter, N. C. Rothschild, 2 ♂ 2 ♀.

## *Penicillidia monoceros* Speiser, 1900

(Fig. 11)

*Penicillidia monoceros*. Speiser, 1900, *Illustr. Zeitschr. Entom.* **5**, 278.

*Penicillidia monoceros* Speiser. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Penicillidia monoceros* Speiser. Markova, 1938, *Zool. Žurn.* **17**, 133.

*Penicillidia dufourii monoceros* Speiser. Karaman, 1939, *Bull. Soc. Sci. Skoplje*, **20**, 131.

*Penicillidia monoceros* Speiser. Ryberg, 1947, *Studies on bats and bat parasites*, Stockholm.

*Penicillidia monoceros* Speiser. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 39.

This species is closely related to *P. dufourii* and differs from it mainly in having the anterior margin of the head prolonged into a long horn which bears shorter setae near the apex and longer setae basally. In the male the arrangement of the spines on sternite 5 differs from that in *P. dufourii* in that the lateral processes are shorter and the median triangular group contains more spines and reaches the lateral group. Parameres long and slender, nearly as long as the aedeagus.

The species is very rare and is considered provisionally as a separate species as it occurs in the area of distribution of *P. dufourii* and on the same hosts.

Distribution and hosts: Continental Europe, on *Myotis daubentoni*, *Plecotus auritus* and *Eptesicus nilssoni*.

*FULVIDA* GROUP

***Penicillidia fulvida* (Bigot, 1885)**

(Figs. 609–613, 625)

*Nycteribia fulvida*. Bigot, 1885, *Ann. Soc. Ent. France*, **6**, 225.

*Penicillidia fulvida* (Bigot). Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Penicillidia fulvida* (Bigot). Falcoz, 1923, *Bull. Mus. Hist. Natur. Paris*, **30**, 223.

*Penicillidia fulvida* (Bigot). Karaman, 1939, *Bull. Soc. Sci. Skoplje*, **20**, 131.

*Penicillidia fulvida* (Bigot). Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 37.

*Penicillidia fulvida* (Bigot). Theodor, 1957, *Parasitology*, **47**, 457.

Length 4–5 mm. Colour reddish brown. Head broadly rounded with a dense group of setae between the eyes. Labella of the proboscis about half the length of the theca.

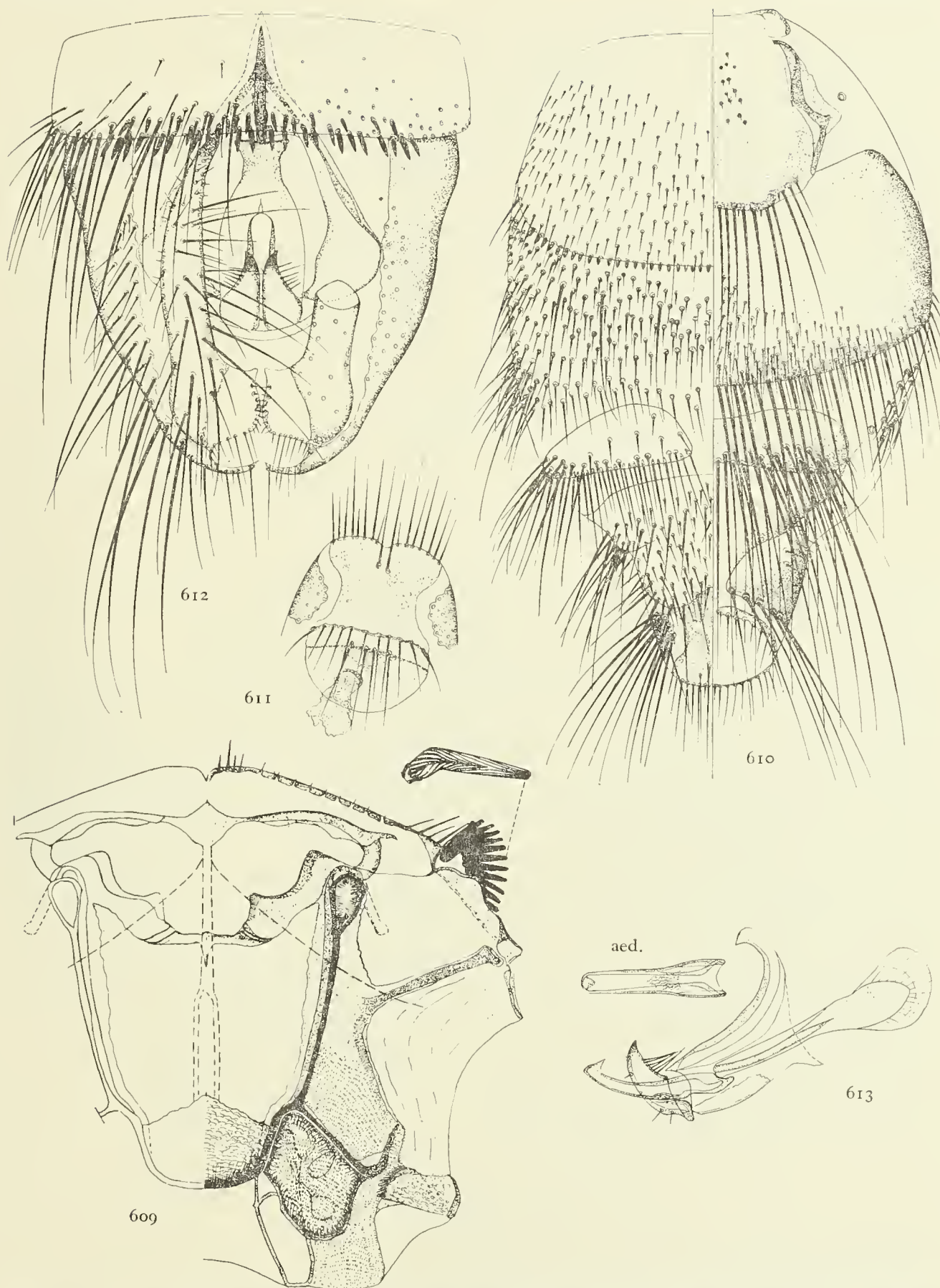
*Thorax*. Notopleural setae absent. Lateral plates of notopleural sutures narrow. Angle of oblique sutures about 100°. Femora about twice as thick as the tibiae. Femur 1 covered with long setae in the distal half of the anterior surface, femora 2 and 3 only in the distal third. Tibiae parallel-sided with 4 rows of setae, those of the distal row longer than the width of the tibia.

*Male abdomen*. Tergite 1 with a marginal row of short setae. Tergite 2 broadly rounded, with a dense marginal row of moderately long setae and 1–2 rows of short setae on the surface. Tergites 3–6 with double marginal rows of very long setae which form a dense brush. Tergites 3 and 4 covered with short hairs. Tergites 5 and 6 shorter, with concave anterior margin and 1 or 2 rows of short setae on the surface. Anal segment conical, with deeply concave anterior dorsal margin, bare on the dorsal surface, long setae posteriorly and a few setae laterally. Sternite 1 + 2 rectangular, with a ctenidium of 50–55 very short spines. The median spines are still shorter and more widely spaced. Surface covered with short setae and a premarginal row of longer setae which are also present on the lateral corners of the posterior margin. Sternites 3–4 very short, with marginal rows of moderately long, thin setae and longer setae at the lateral corners. Surface bare. Sternite 5 longer, with straight posterior margin with a group of 40–50 spines in 2 rows. The spines of the posterior row are longer, particularly laterally. Long setae in the lateral posterior corners and short setae in a row anterior to the group of spines.

*Genitalia*. Claspers thick, slightly curved, with long, pigmented tip and many long setae on the dorsal surface in the basal two-thirds. Basal arc triangular, with long anterior process. Aedeagus slightly curved, tapering, with a long apical dorsal tooth and a few rows of scale-like teeth in the basal half. Parameres triangular, with a row of 5–6 setae dorsally.

*Female abdomen*. Tergite 1 with a row of about 20 long setae posteriorly. Tergal plate 2 with a single or double row of long setae posteriorly and short hairs on the posterior part of the surface. Tergal plate 3 short and wide, undivided, wider laterally and with a double row of long setae posteriorly. Abdomen bare between tergal plate 2 and 3 and between tergal plate 3 and the anal segment. Anal segment short, conical, sclerotized mainly laterally, with a row of long setae around the anus. Sternite 1 + 2 longer than in the male, with a ctenidium of 50–55 ordinary, widely spaced, short spines. Sternite 5 with widely separated, elliptical sclerites which are obliquely placed. They have long setae posteriorly. Sternites 6 and 7 fused. Sternite 6





Figs. 609-613. *Penicillidia fulvida* (Bigot). 609. dorsal pattern of thorax; 610. female abdomen (right-dorsal, left-ventral); 611. genital plates; 612. male sternite 5 and genital area; 613. male genitalia, with dorsal view of aedeagus.

curved, with short lateral processes. Sternite 7 with posterior rounded lobes which bear long setae. Dorsal genital plate broadly rounded, with a double row of 12-15 setae near the base. Ventral genital plate small, irregularly shaped.

Distribution and hosts: throughout Ethiopian Africa south of the Sahara; Southern Arabia. Apparently quite unspecific, recorded from 14 species of bats, belonging to 7 genera and 5 families. Details, see Theodor, 1957.

MATERIAL IN THE COLLECTION

SOUTH AFRICA

Cape of Good Hope, male holotype.  
Knysna, Cape Colony, from *Eidolon helvum*, O. Thomas, N. C. Rothschild, 1 ♂.  
Kleinemonde, Cape prov., Omer Cooper, 3 ♂ 2 ♀.  
Natal, from *Vespertilio* sp. Krause, N. C. Rothschild, 1 ♂.

Elburgon, R. E. Dent, 1 ♀ (Brit. Mus. 1931.420).  
Mt Elgon, Kenya side, from *Miniopterus schreibersi arenarius*, 4.iii. 1935, F. W. Edwards, 3 ♂ 14 ♀ (Brit. Mus. 1935.203).  
Mt Elgon, Kenya side, from *Rhinolophus keniensis*, 4.iii. 1935, F. W. Edwards, 1 ♀ (Brit. Mus. 1935.203).

KENYA

Kericho, Lumbwa district, from *Hipposideros caffer*, 21.xi. 1912, C. M. Dobbs, 1 ♀.

SUDAN

Kaure, Torit, from *Miniopterus* sp., no. 1831, Reid, 1 ♂.

**Penicillidia decipiens** Theodor, 1957

(Figs. 614-616)

*Penicillidia decipiens*. Theodor, 1957, *Parasitology*, **47**, 457.

*Penicillidia fulvida* Bigot. Speiser, 1901, *Arch. Naturgesch.* **67**, 11. (Madagascar record.)

Length 4 mm. Colour reddish brown. Head as in *P. fulvida*.

*Thorax*. In general as in *P. fulvida*, but there is a row of 5-6 long notopleural setae. The lateral plates of the notopleural sutures are narrower anterior to the mesopleural suture than posterior to it.

*Female abdomen*. Tergite 1 triangular, with a marginal row of short setae with a gap in the middle. Tergal plate 2 broadly rounded, with a dense marginal row of long setae with a gap in the middle, covered with short hairs in the posterior part of the surface and with a clearly marked, bare median division strip. Tergal plate 3 absent, and the dorsum is bare between tergal plate 2 and the anal segment. This is large, with a dense row of very long setae around the anus. The lateral sclerites of the anal segment are covered with short hairs. Ventral surface as in *P. fulvida*, but sternite 1 + 2 is narrower and has a ctenidium of 36 short and widely spaced spines. The lateral sclerites of sternite 5 are covered with short hairs. Dorsal genital plate rounded triangular, with a row of about 10 setae across the base. Ventral plate small, triangular.

Male unknown.

Female holotype, Department of Parasitology, Hebrew University, Jerusalem.

Distribution: Madagascar, hosts not known.

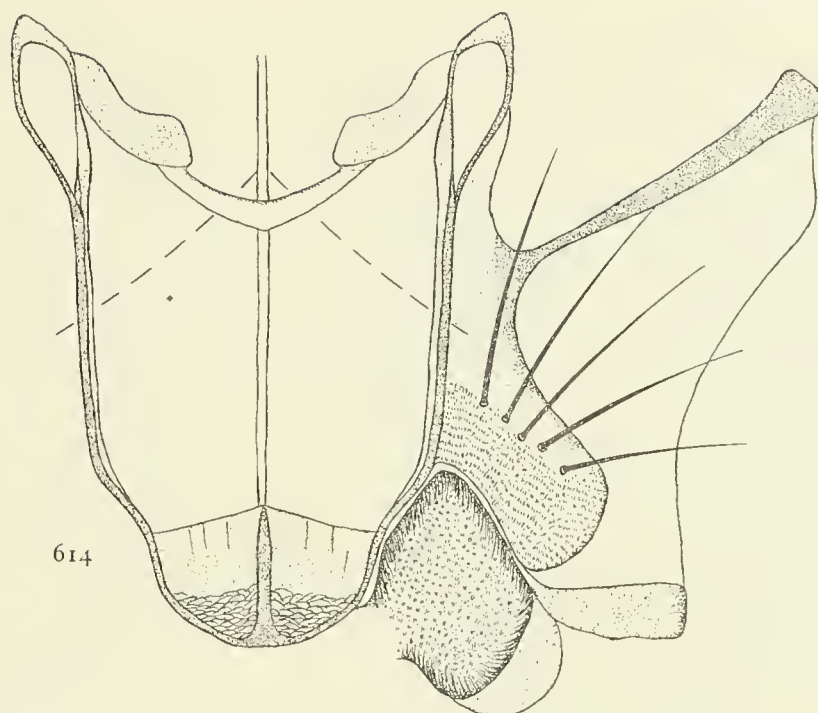
**Penicillidia pachymela** Speiser, 1901

(Figs. 617-623, 624)

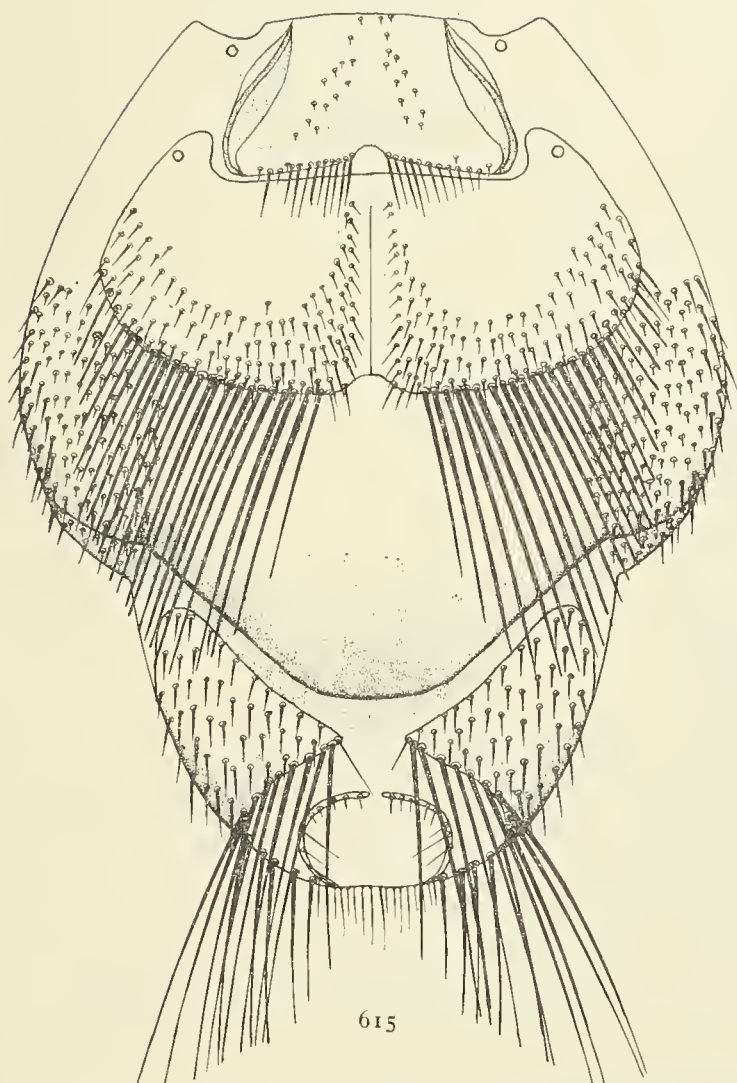
*Penicillidia pachymela*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Penicillidia pachymela* Speiser. Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117.

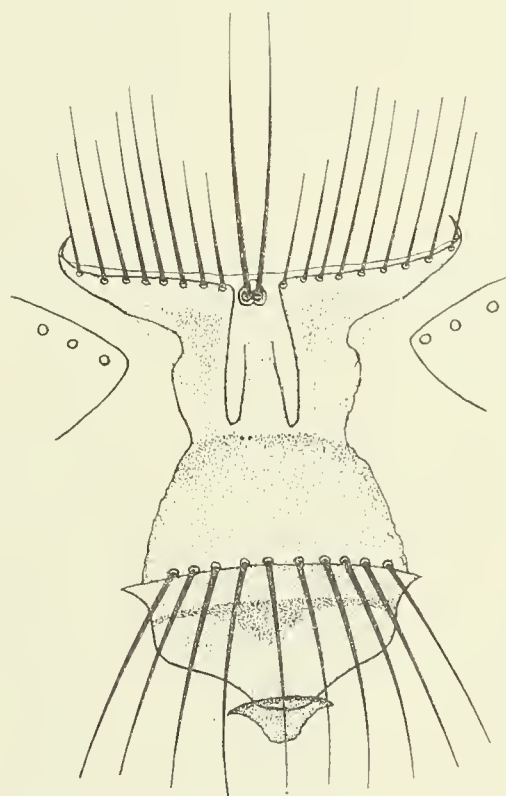
*Penicillidia pachymela* Speiser. Theodor, 1957, *Parasitology*, **47**, 457.



614



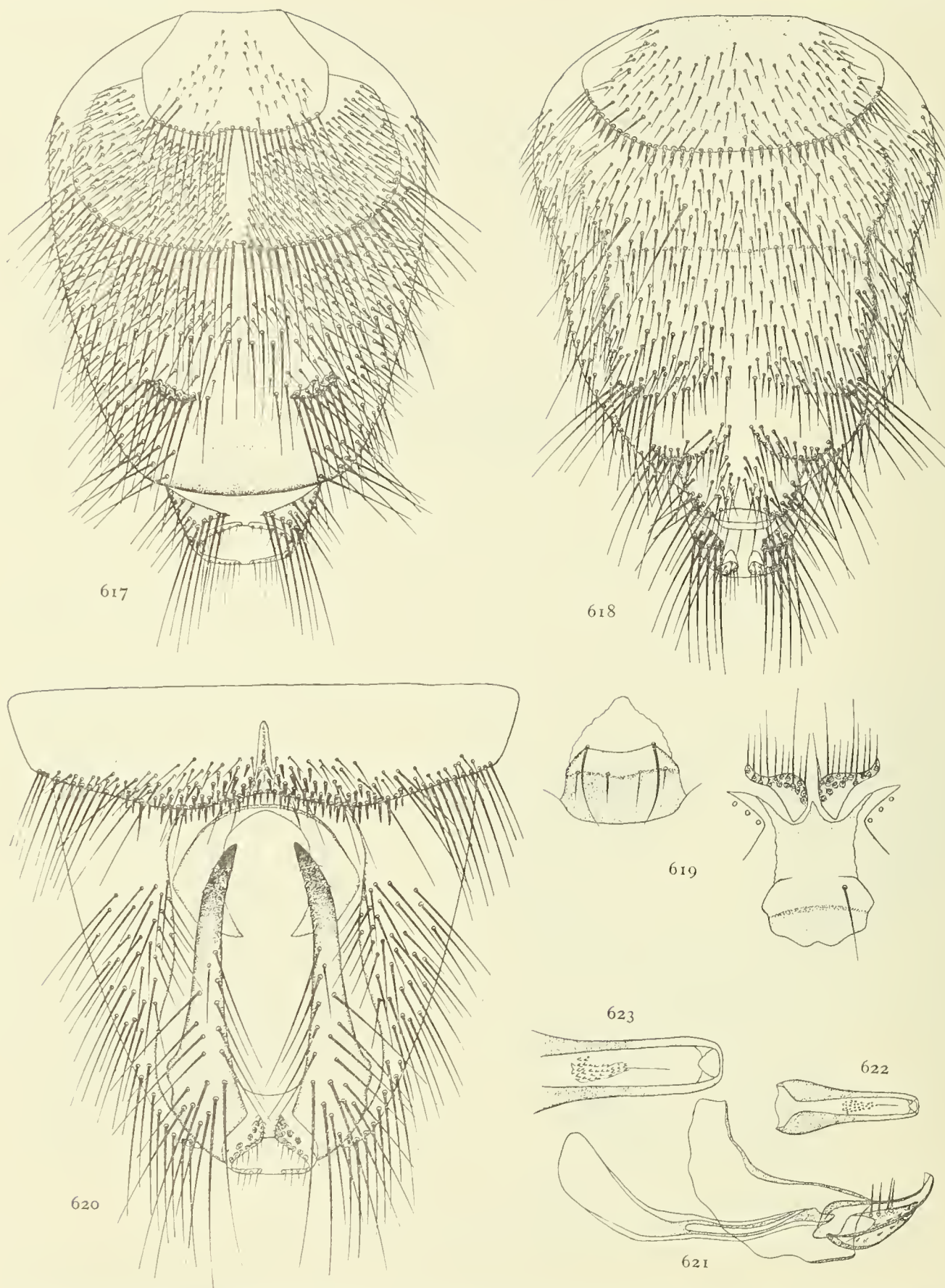
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616

Figs. 614-616. *Penicillidia decipiens* Theodor. 614. dorsal pattern of thorax; 615. female abdomen, dorsal; 616. genital plates.



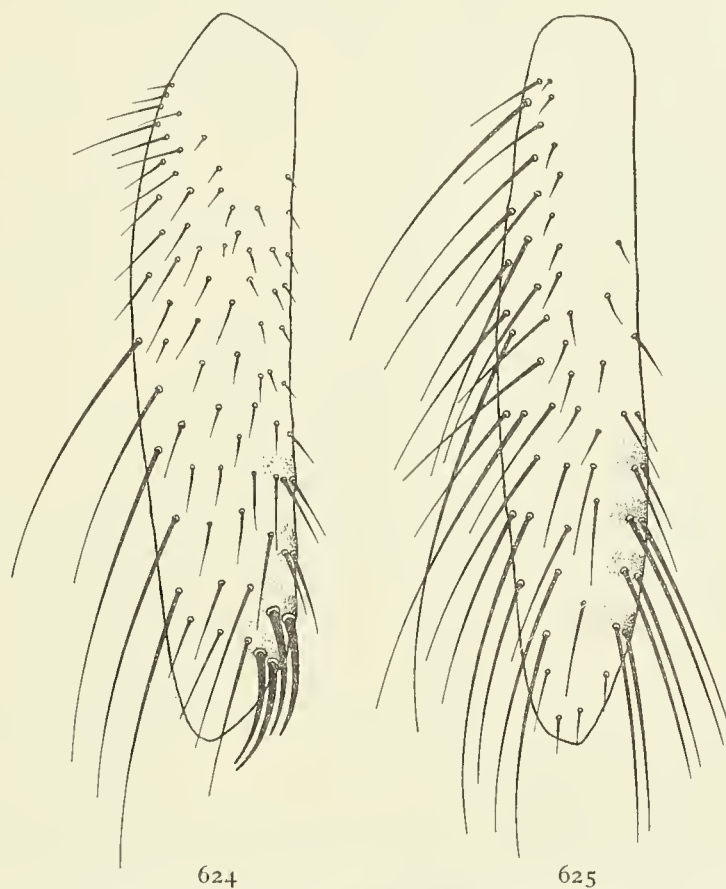


Figs. 617-623. *Penicillidia pachymela* Speiser. 617. female abdomen, dorsal; 618. same, ventral; 619. genital plate; 620. male sternite 5 and genital area; 621. male genitalia; 622. aedeagus, dorsal; 623. aedeagus, tip enlarged.

Length 4.5–5 mm. Colour blackish brown, some specimens reddish brown.

*Head.* A group of 5–6 rows of setae between the eyes. Labella of the proboscis shorter than the theca.

*Thorax.* Length to width = 5 : 6.5. Angle of oblique sutures  $100^{\circ}$ . Thoracic ctenidium with about 22 long, pointed spines. Mesonotum wide, with broad posterior plate. Lateral plates of the notopleural sutures with concave lateral margin. Notopleural setae absent. Femora thick, their anterior surface covered with short setae up to the basal ring. Tibiae parallel-sided, with 4–5 rows of short, thick setae distally. The setae of the 2 distal rows about as long as the width of the tibiae.



Figs. 624, 625. Hind tibia of: 624. *Penicillidia pachymela* Speiser; 625. *P. fulvida* (Bigot).

*Male abdomen.* Tergite 2 broadly rounded, with a marginal row of moderately long setae. Surface covered with several rows of short setae in the posterior part, except in a median strip. Tergites 3–6 short, with a dense, irregular, double marginal row of long and short setae. Tergite 3 covered with short setae, except for a median strip. Only a single row on tergite 4, tergites 5 and 6 bare. Anal segment conical, truncate, with deeply concave anterior dorsal margin, bare on the dorsal surface and with long setae laterally and posteriorly. Sternite 1 + 2 rectangular, with a ctenidium of about 40 widely spaced, short spines which are longer laterally. Surface covered with short setae and a premarginal row of long setae. Sternites 3 and 4 short, with marginal rows of short setae and 1–2 rows of short setae on the surface. Sternite 5 as long as sternites 3 and 4 together, with 60–70 short spines in 3 rows along the posterior margin.



*Genitalia.* Claspers strong, curved, tapering to dark tips. Dorsal surface covered with several rows of long setae in the basal two-thirds. Basal arc with broad lateral flaps and long anterior process. Phallobase concave dorsally, dorso-ventrally depressed. Aedeagus tapering, curved, with a short dorsal tooth at the tip and a few scale-like teeth in the middle of the ventral surface. Apodeme long, with narrow end-plate. Parameres triangular, with 4-5 setae at the dorsal margin.

*Female abdomen.* Tergite 1 rounded posteriorly, with a marginal row of 25-30 setae. Tergal plate 2 broadly rounded with a dense marginal row of long setae. Surface covered with short setae leaving a median strip bare, which is absent in some specimens. Tergite 3 membranous with a marginal row of long setae and several rows of short setae on the surface which are more numerous laterally. Tergite 4 with 2 groups of long setae with a bare gap between them. In some specimens the groups are not clearly marked and the setae are more widely spaced. In other specimens the setae are placed on sclerotized areas. Another row of setae between the groups of setae and the anal segment which may indicate the posterior margin of a tergite. The chaetotaxy of the abdomen is extremely variable so that in some specimens the middle of the dorsum is bare, while in others the whole dorsum is covered with equally spaced setae. Anal segment short, conical, sclerotized mainly laterally. A row of long setae around the anus and shorter setae anteriorly. Pleurae covered with short setae. Sternite 1 + 2 rectangular, with a ctenidium of about 40 short, widely spaced spines. A premarginal row of long setae and short setae on the surface. Sternite 5 consists of 2 obliquely placed groups of setae which in some specimens stand on sclerotized areas. Sternite 6 similar, but the groups of setae are placed more closely together. Sternite 7 with rounded lobes posteriorly which bear long and short setae. Dorsal genital plate large, semicircular, covering the genital opening from above. There is a transverse row of 2 long setae near the base and 4 shorter setae in some specimens and one or none in others. Ventral genital plate absent.

Distribution and hosts: Tropical Africa from Somaliland to the Cameroons, between 10° lat. North and South, from *Hipposideros caffer*, *Nycteris* sp. and *Rhinolophus eloquens*.

MATERIAL IN THE COLLECTION

KENYA

Nairobi, Febr. 1912, 1 ♂.  
Ngong hills, near Nairobi, 19.ix. 1934, G. van Someren, 1 ♂.  
Tana bridge, 1.ii. 1948, G. van Someren, 2 ♂.

Kilosa, Ihonga, from bat, H. J. Disney, 1 ♂.  
Kilimafeza, Serengeti, from *Nycteris* sp., 13.i. 1952, A.C.B., 1 ♂.  
Banagi Hill, from bat no. 162, 1.ii. 1952, A.C.B., 1 ♂ 1 ♀.

TANGANYIKA

Kilosa, from *Hipposideros caffer*, 1.v. 1923, A. Loveridge, N. C. Rothschild, 1 ♀.

NORTHERN RHODESIA

Kasempe Boma, from *Hipposideros caffer*, 3.iv. 1952, W. F. H. Ansell, R. W. Hayman, 1 ♂ 1 ♀.

JENYNSII GROUP

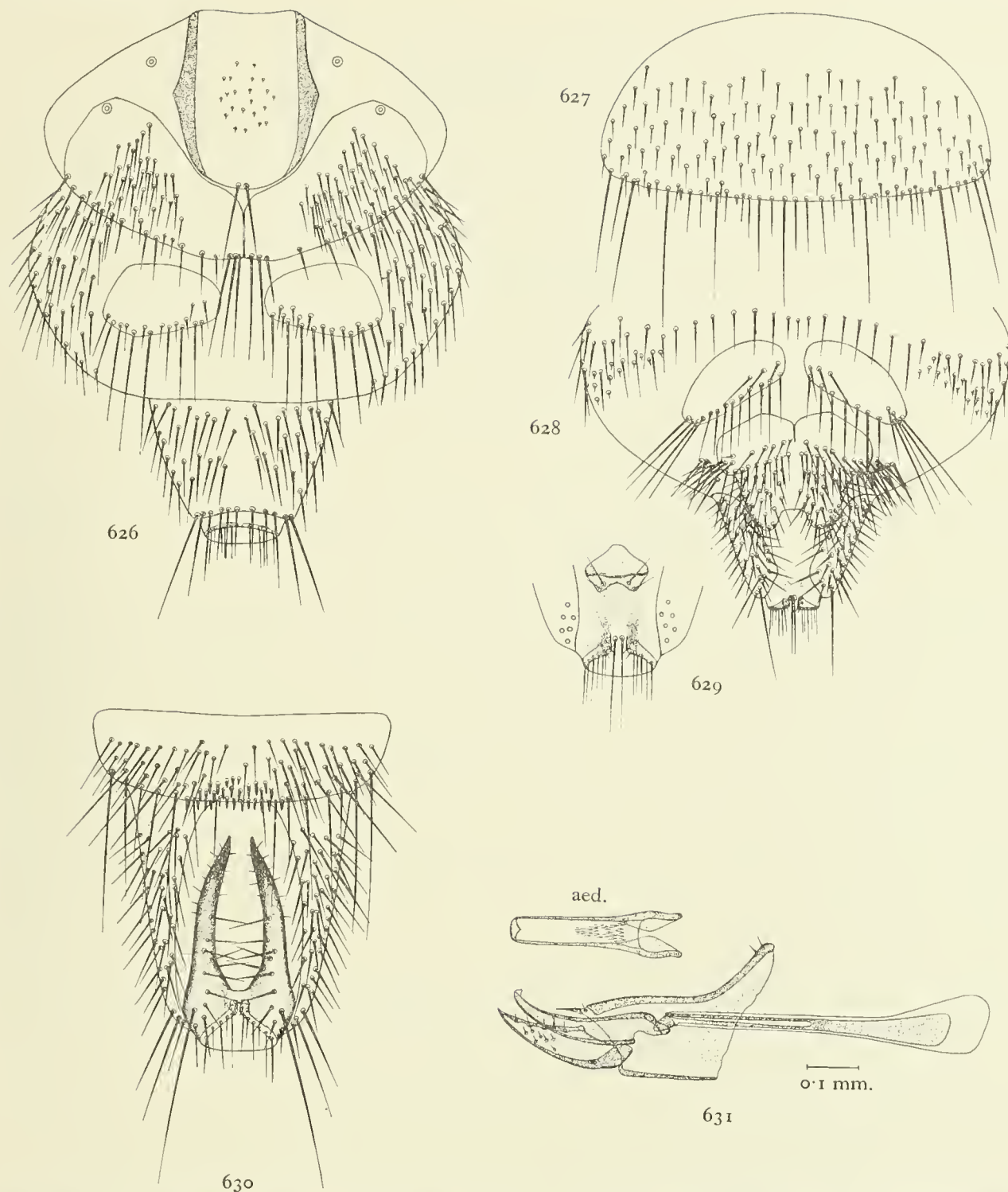
*Penicillidia buxtoni* Scott, 1932

(Figs. 626-631)

*Penicillidia buxtoni*. Scott, 1932, *Stylops*, 1, 16.

Length 2.5 mm. Colour yellowish. Head with 5-6 dense rows of setae between the eyes which reach well behind them. Labella of the proboscis about half as long as the theca. Eyes very small.





Figs. 626–631. *Penicillidia buxtoni* Scott. 626. female abdomen, dorsal; 627. female sternite 1+2; 628. female abdomen, ventral, posterior part; 629. female genital plates; 630. male sternite 5 and genital area; 631. male genitalia, with dorsal view of aedeagus.

*Thorax.* Length to width = 3 : 4. Thoracic ctenidia small, with about 12 thin, pointed spines. Lateral plates of the notopleural sutures wide. About 5–8 very long notopleural setae in the female, 3–6 thin setae which are about half as long, in the male. Tibiae long, 6–7 times as long as wide, with 4 rows of setae distally. The setae of the distal row reach beyond the tip.

*Male abdomen.* Tergites 1 and 2 fused. Tergite 2 with a marginal row of moderately long and

short setae. Tergites 3–6 with marginal rows of very long and strong setae in the middle. Tergites 5 and 6 very short, strip-like, with concave anterior margin. Surface of tergites 2–6 covered with short hairs. Anal segment conical, with short setae on the dorsal surface and longer setae posteriorly. Sternite 1 + 2 large, with convex posterior margin. Ctenidium much reduced, consisting of only 10–12 short ordinary spines between widely spaced long and short setae. The spines in the middle are shorter and absent in some specimens. Surface covered with short hairs. Sternites 3 and 4 with marginal rows of longer and shorter setae laterally and shorter setae in the middle. 1–2 rows of short setae on the surface. Sternite 5 longer, with convex posterior margin and with a triangular group of 25–30 short spines in 3–4 rows at the posterior margin. Long and shorter setae lateral to the group of spines and 2–3 rows on the surface.

*Genitalia.* Claspers curved, tapering to dark points, with a long seta dorsally at the base and several rows of shorter setae on the dorsal surface in the basal two-thirds. Basal arc broad, with lateral flaps. Aedeagus broad, parallel-sided, widening only little at the base, and with scale-like teeth in the basal half in dorsal view, curved, tapering in side view, with a dorsal tooth at the tip. Apodeme with a wide end-plate. Parameres triangular, curved, with pointed apical end and short hairs along the dorsal edge. Phallobase narrow with 2 setae near the base.

*Female abdomen.* Tergite 1 rounded posteriorly, longer than wide, with 2–4 short setae in the middle of the posterior margin. Tergal plate 2 short, divided in the middle, with 6–8 long setae in the middle of the posterior margin and several short, widely spaced setae laterally. Some longer, more closely placed setae at the lateral corners. A group of short setae in the middle of the surface in each half. The number of these hairs varies widely in different specimens. In some the greater part of the surface may be covered, in others only 10 hairs may be present in each half. Tergal plate 3 divided into widely separated lateral sclerites with marginal rows of 4–5 very long and some shorter setae. Connexivum bare in the middle, covered with short setae laterally. Anal segment short, conical, with about 3 rows of shorter setae anteriorly and a row of longer setae around the anal frame. Sternite 1 + 2 with a ctenidium which is even more strongly reduced than in the male. There are only 3–4 spines in most specimens at each side of the posterior margin, long setae in the lateral parts of the posterior margin, only short setae in the middle. The sclerite is surrounded by a fold of bare connexivum in distended specimens. 6–8 rows of short setae behind sternite 1 + 2 probably represent sternites 3 and 4. Sternite 5 with 2 obliquely placed, elliptical sclerites with a marginal row of longer and shorter setae and long setae laterally. A few long vertical setae at the lateral corners and a few shorter premarginal setae on the surface. Sternites 6 and 7 fused. The setae on sternite 6 are arranged similarly as on sternite 5, but the group in the lateral corners forms a thick brush and the premarginal row is complete. Sternite 7 forms 2 posterior processes with long setae posteriorly and short setae on the surface. The anal frame widens ventrally and has 2 setae between the ventral ends of the frame. Genital plate triangular, with a more heavily sclerotized base and 2–4 setae at the base. Ventral plate small, narrow.

## MATERIAL IN THE COLLECTION

## NEW HEBRIDES

Espiritu Santo, Hog Harbour, from *Miniopterus australis*, 21.vii. 1925, P. A. Buxton, ♀ holotype, 1 ♂ 6 ♀ paratypes (Brit. Mus. 1936.99).

Espiritu Santo, Hog Harbour, from *Miniopterus australis*, 17.ii. 1927, J. R. Baker, 2 ♂ 2 ♀ paratypes.

Tanna, from *Miniopterus australis*, 22.ix. 1925, P. A. Buxton, 1 ♂ 1 ♀.



**Penicillidia heinrichi** n.sp.

(Figs. 632-635)

Length 3.5 mm. Colour brown. Head with 4-5 rows of setae between the eyes and a few shorter setae behind them. A double row of short setae at the anterior ventral margin. Labella of the proboscis about half the length of the theca.

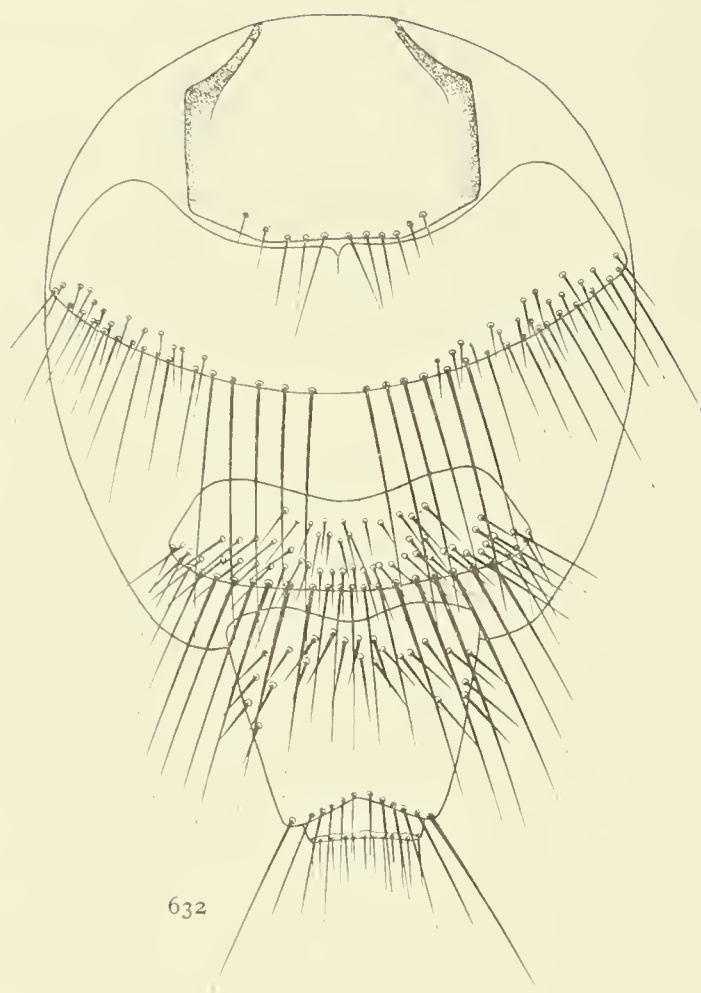
*Thorax.* Length to width = 4:5. Median sternal suture well marked, narrow. Angle of oblique sutures about 90°. Thoracic ctenidium with about 15 pointed spines. 1-3 long notopleural setae in both sexes. Tibiae slender, 5 times as long as wide, with 3-4 rows of setae near the distal end.

*Male abdomen.* Tergites 1 and 2 fused. A row of setae indicates the posterior margin of tergite 1. Tergite 2 with a marginal row of moderately long setae, surface covered with short setae. Tergites 3-6 with marginal rows of shorter setae laterally and very long, strong setae in the middle. Surface covered with short setae. The posterior tergites are very short and have only 1-2 rows of short setae on the surface. Anal segment conical, with short setae on the lateral and posterior parts of the dorsal surface and long setae posteriorly. Sternite 1 + 2 with ctenidium of about 30 ordinary spines, those in the middle much shorter. Surface with short setae and a premarginal row of 10 long setae. Sternites 3 and 4 with marginal rows of short setae and 3-4 long setae laterally. Short setae on the surface in a premarginal row in the middle and several rows laterally. Sternite 5 longer, trapezoidal, with a group of 25-35 spines in 2 rows at the posterior margin, the lateral spines longer than the median ones. A premarginal row of setae in the middle and several rows laterally.

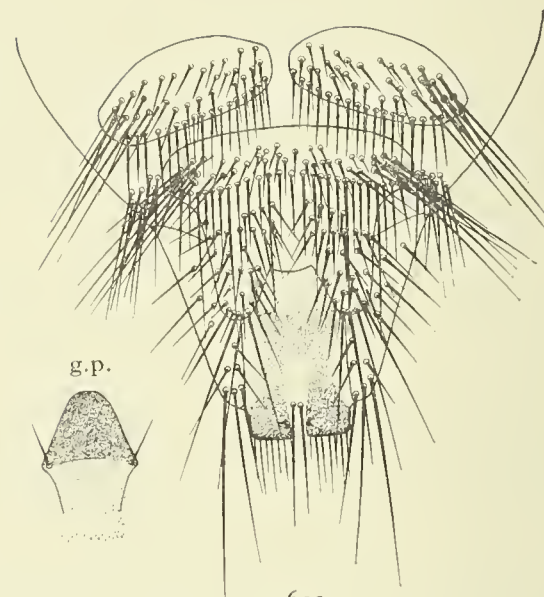
*Genitalia.* Basal arc triangular, with narrow lateral flaps. Claspers curved, with dark ends, 2 long setae dorsally near the base and shorter setae up to the apical third. Aedeagus curved, tapering, with a long, sharp dorsal tooth at the tip. Ventral surface covered with scale-like teeth from the tip to the basal quarter at the sides, but only in the apical third in the middle. Parameres slender, with wide, rounded apical end, nearly parallel-sided, with minute hairs at the dorsal margin.

*Female abdomen.* Tergite 1 rectangular, with a row of widely spaced short setae at the posterior margin. Tergal plate 2 short, with a marginal row of long setae in the middle and shorter setae laterally. A small gap in the middle of the row. Short hairs in the lateral posterior parts of the surface. Tergal plate 3 trapezoidal, with a marginal row of setae which are longer than those of tergal 2, a premarginal row of shorter setae and several rows of short hairs on the surface. Anal segment conical, with several rows of short setae near the base and a row of longer and shorter setae surrounding the anal frame. Sternite 1 + 2 with the ctenidium much reduced, only 4-5 short, ordinary spines between the setae at the sides of the posterior margin. Only shorter setae in the middle. Short setae on the surface of the sternite (much denuded in the 3 specimens available). Sternites 3 and 4 with marginal rows of short setae, 6-8 rows of short setae and a curved row of 6 very long vertical setae on the surface of sternite 3. 2-3 rows of short setae and 1 long vertical seta at each side on sternite 4. Sternite 5 with elliptical lateral sclerites with marginal rows of moderately long setae and some long vertical setae at the sides of the surface and short setae on the rest of the surface. Sternites 6 and 7 fused. Sternite 6 with a

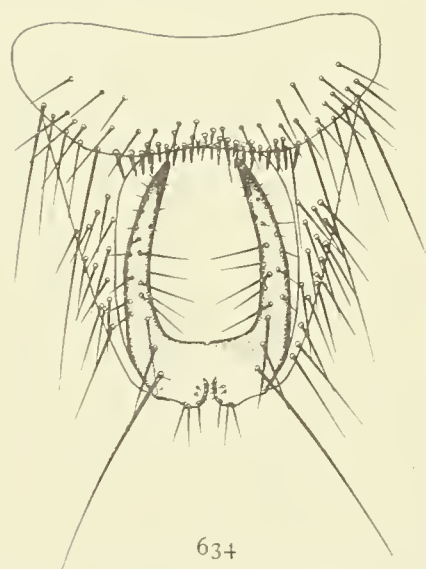




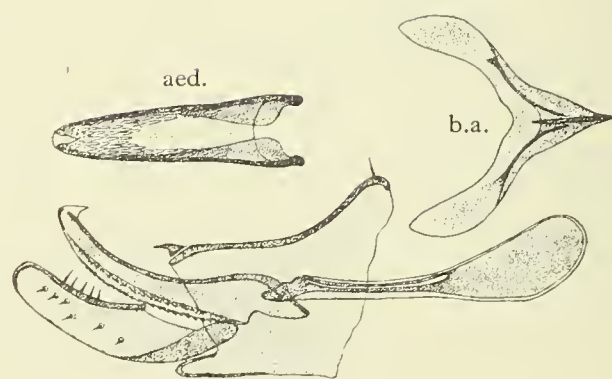
632



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634



635

Figs. 632-635. *Penicillidia heinrichi* n.sp. 632. female abdomen, dorsal; 633. same, ventral, posterior part, with genital plate; 634. male sternite 5 and genital area; 635. male genitalia, profile, with dorsal view of aedeagus and basal arc.

thick brush of setae at the lateral corners and shorter setae medially, otherwise resembling sternite 5. Sternite 7 with rounded posterior lobes which bear long setae and short setae on the surface. A thick brush of setae on the pleurae between anal segment and sternite 6. Dorsal genital plate long, triangular, with rounded tip and 2 long setae at the base. Anal frame much widened ventrally with 2 setae between the ends.

## MATERIAE IN THE COLLECTION

## BURMA

Mandalay and Fort Ava near Mandalay, from *Miniopterus* sp., 22.xi. 1937, G. Heinrich, ♀ holotype, 3 ♂ 2 ♀ paratypes (Brit. Mus. 1946.288).

***Penicillidia actedona* n.sp.**

(Figs. 636–638)

This species resembles *P. heinrichi* closely, but differs in a number of important details, mainly in the structure of the genitalia.

The aedeagus of the male bears teeth in the basal two-thirds of the ventral surface only. Sternite 1 + 2 of the female has no ctenidium, but only a marginal row of long and short setae, while that of the male has a well developed ctenidium of about 30 ordinary spines. The genital plate is shorter than in *P. heinrichi*, its length less than the distance between the basal setae.

This may eventually prove a subspecies of *P. heinrichi*, but more material is needed to determine the status of this form.

## MATERIAL IN THE COLLECTION

## SOUTH-WEST THAILAND

From *Vespertilio* no. 2426–2438, 1917, C. Boden Kloss, ♀ holotype, 1 ♂ paratype (Brit. Mus. 1917.43).

***Penicillidia indica* Scott, 1925**

(Figs. 639–641)

*Penicillidia jenynsii* Westwood. Scott, 1914, *Ann. Mag. Nat. Hist.* (8), **14**, 209.

*Penicillidia jenynsii* Westwood. Phillips, 1924, *Spol. Zeyl.* **13**, 65.

*Penicillidia jenynsii* var. *indica*. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Penicillidia jenynsii* var. *indica*. Scott, 1936, *Linn. Soc. Jour. Zool.* **39**, 479.

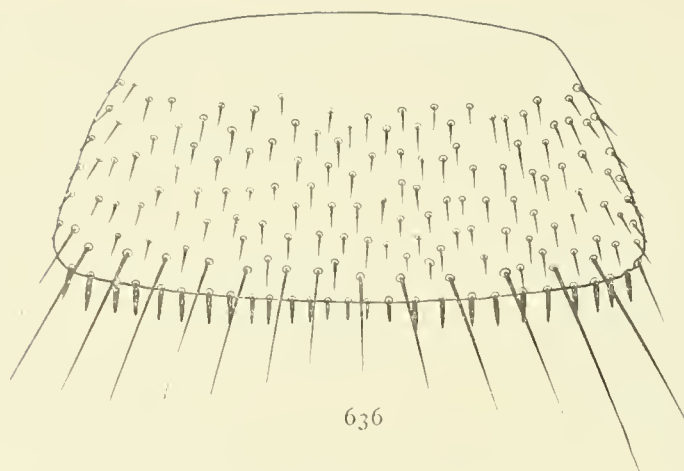
*Penicillidia indica* Scott. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 38.

Length 3.5 mm. Colour reddish brown, more heavily sclerotized and setose than *P. jenynsii*. Head with 5–6 rows of setae between the eyes.

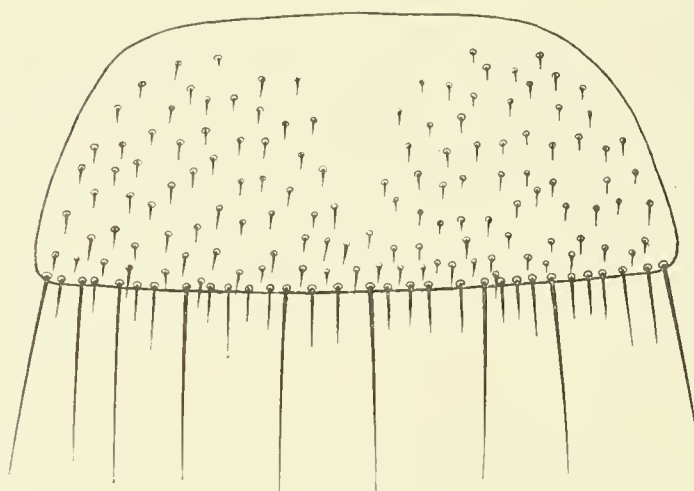
*Thorax.* As in *P. jenynsii*, but notopleural setae lacking in both sexes.

*Male abdomen.* As in *P. jenynsii*, but the abdominal ctenidium consists of 40–50 spines which are longer than in *P. jenynsii*, equally spaced and little shorter in the middle. Sternite 5 triangularly produced in the middle, with a group of 20–25 spines in 2 rows at the posterior margin. The lateral spines are longer and more widely spaced. The surface of the sternite is covered with short setae in its greater part, except for a narrow median strip.

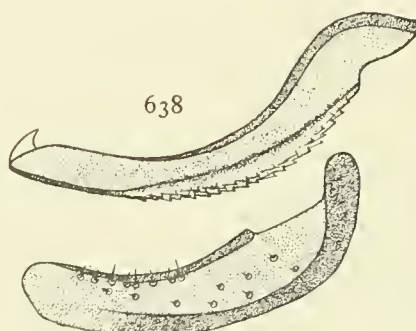
*Genitalia.* Claspers shorter and thicker than in *P. jenynsii*. Aedeagus curved, tapering to a rounded point without a dorsal tooth. Scale-like teeth only in the basal half of the ventral surface. Parameres long and slender, curved, nearly parallel-sided, with a blunt apical end.



636



637

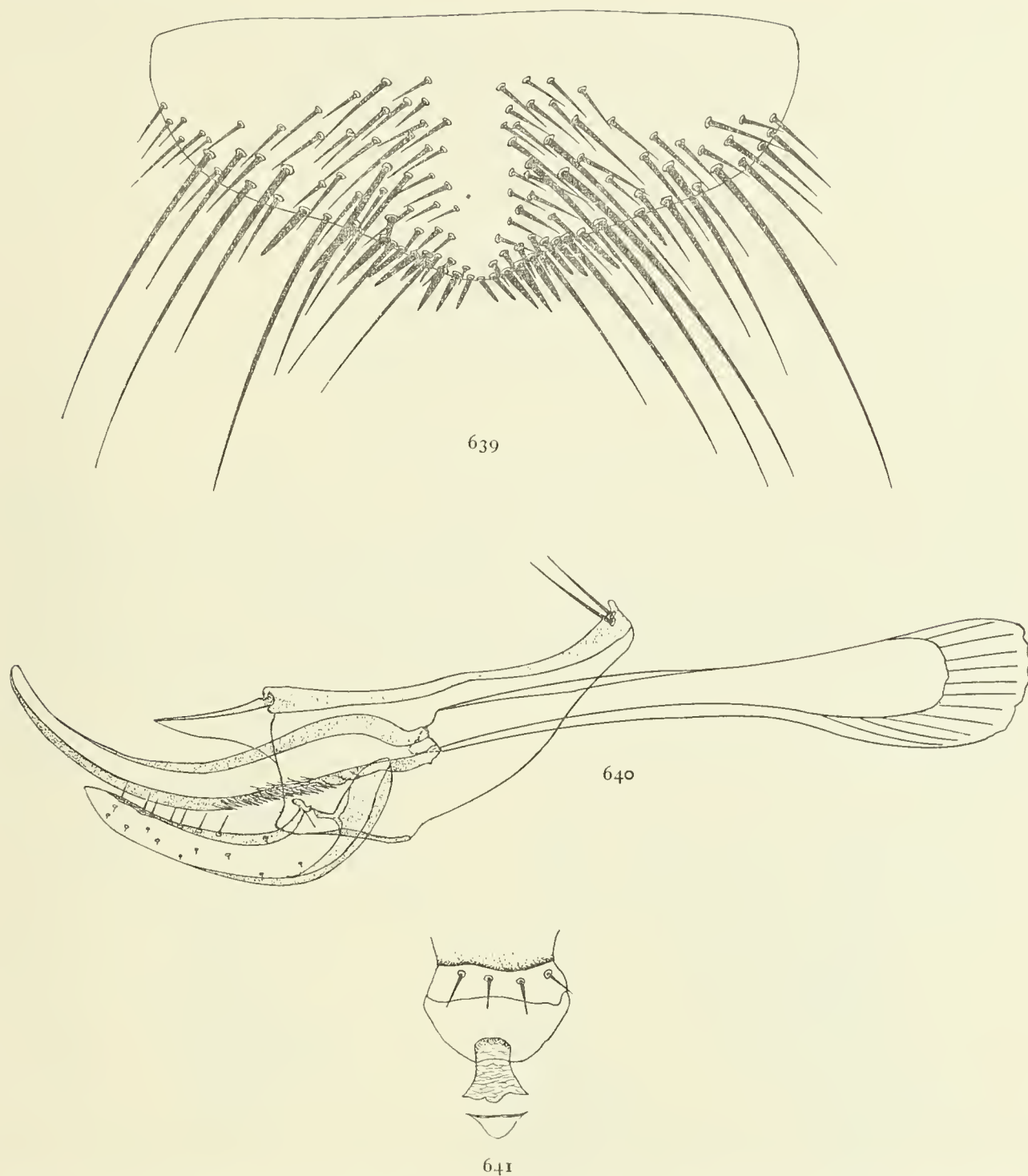


638

Figs. 636-638. *Penicillidia actedona* n.sp. 636. sternite 1+2 of male; 637. same, female; 638. male aedeagus and paramere.

*Female abdomen.* Resembling *P. jenynsii* except for the following details: tergite 1 with a row of 8-10 moderately long setae at the posterior margin. Tergal plate 2 with a marginal row of about 20 long setae alternating with short setae. Tergal plate 3 divided into elliptical lateral sclerites. Anal segment divided into lateral sclerites. Abdominal ctenidium consisting of 50-60 long, equally spaced spines. Pleurae covered with short spines. Genital plate rounded, with 4 setae near the base.





Figs. 639-641. *Penicillidia indica* Scott. 639. male sternite 5; 640. male genitalia; 641. female genital plates.

MATERIAL IN THE COLLECTION

INDIA

Mahabaleshwar, Satara district, Bombay, from *Miniopterus schreibersi*, 13-16.iv. 1912, F. H. G., ex coll. Indian Museum, 3 ♂ 4 ♀ paratypes of *P. jenynsii* var. *indica*.

CEYLON

Dammeria, Passara, Uva, from *Miniopterus schreibersi fuliginosus*, 15.v. 1922, W. W. A. Phillips, 2 ♂ 1 ♀ paratypes of *P. jenynsii* var. *indica*.  
Peradeniya, from *Miniopterus schreibersi*, 30.i. 1912, J. C. F. Fryer, 1 ♀.

Lunugala, Uva, from bats, 10.vii. 1913, E. W. Mayor, 1 ♂ 1 ♀.  
Mousakande, Gammaduwa, East Matale, from *Miniopterus schreibersi fuliginosus*, 30.iii. 1925, 17.iii. 1933, W. W. A. Phillips, 2 ♂ 1 ♀ (Brit. Mus. 1933.262).

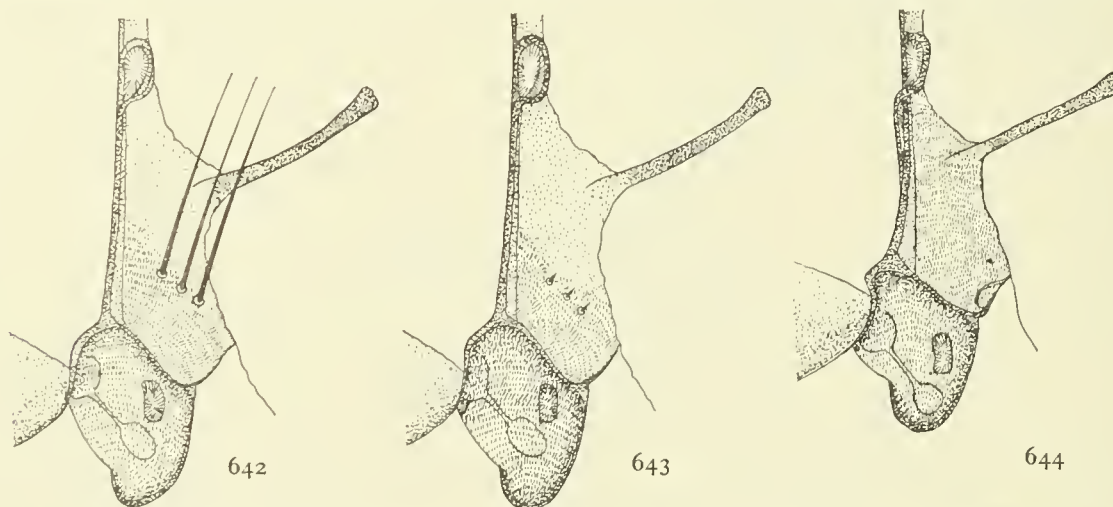
Kosgalla, Tonacambe, Namunukula, from *Miniopterus schreibersi fuliginosus*, 7.viii. 1955, W. W. A. Phillips, 1 ♂ 2 ♀.  
Namunukula, from *Pipistrellus ceylonicus*, 12.iv. 1956, W. W. A. Phillips, 1 ♀.

**Penicillidia jenynsii** (Westwood, 1835)

(Figs. 642, 643, 645-648)

- Nycteribia jenynsii*. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275.  
*Nycteribia jenynsii* Westwood. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.  
*Nycteribia jenynsii* Westwood. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.  
nec *Penicillidia jenynsii* (Westwood). Speiser, 1901, *Arch. Naturgesch.* **67**, 11. (Sumatra material.)  
nec *Penicillidia jenynsii* (Westwood). Speiser, 1908, *Zeitschr. wiss. Insektenbiol.* **4**, 302. (Record from the Indo-Malayan region.)  
*Penicillidia jenynsii* (Westwood). Scott, 1908, *Trans. Ent. Soc. Lond.* p. 359 (description of female allotype).  
*Penicillidia jenynsii* (Westwood). Scott, 1913, *Arch. Naturgesch.* **79**, 92.  
nec *Penicillidia jenynsii* (Westwood). Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209 (refers to *P. indica*).  
nec *Penicillidia jenynsii* (Westwood). Ferris, 1924, *Phil. Jour. Science*, **25**, 391 (refers to *P. oceanica acuminata* and *P. oligacantha*).  
nec *Penicillidia jenynsii* (Westwood). Phillips, 1924, *Spol. Zeyl.* **13**, 65 (refers to *P. indica*).  
*Penicillidia jenynsii* (Westwood). Kishida, 1932, *Iconogr. Insect. Japon.*  
*Penicillidia jenynsii* (Westwood). Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.  
*Penicillidia jenynsii* (Westwood). Karaman, 1939, *Bull. Soc. Sci. Skoplje*, **20**, 131. (Formosa material only.)  
*Penicillidia jenynsii* (Westwood). Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 39.  
*Penicillidia jenynsii* (Westwood). Theodor, 1963, *Fieldiana, Zool.* **42**, 151.

Length 3 mm. Head with 4-5 rows of setae between the eyes. Labella of the proboscis shorter than the theca.



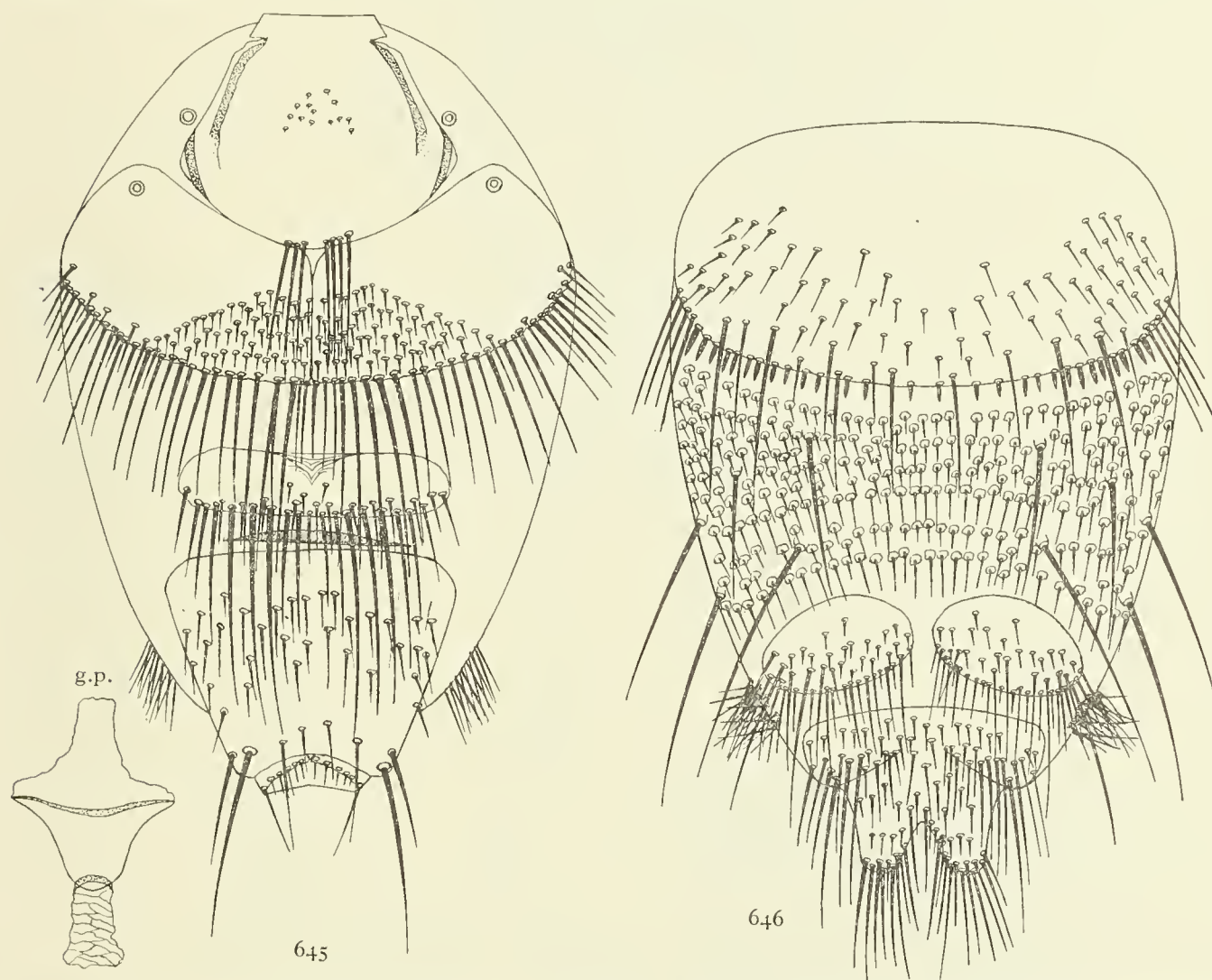
Figs. 642-644. Lateral plates of the notopleural sutures of: 642. *P. jenynsii*, female, with long setae; 643. *P. jenynsii*, male, with short spines; 644. *P. oligacantha*, notopleural setae lacking.

*Thorax.* 1-3 long notopleural setae in the female, 1-3 minute notopleural spines in the male. Sternal plate strongly convex.

*Male abdomen.* Tergites 1 and 2 fused. Tergite 2 with a marginal row of short setae, tergites 3-6 with some very long setae in the middle of the marginal rows. Tergites 3 and 4 covered with short hairs, only a few on tergites 5 and 6. Anal segment conical. Sternite 1 + 2 with a ctenidium

of about 30 spines which are smaller and more widely spaced in the middle. Sternite 5 slightly convex posteriorly, with a group of about 20 spines in an irregular double row which has a small gap in the middle. The lateral spines are longer than the median ones.

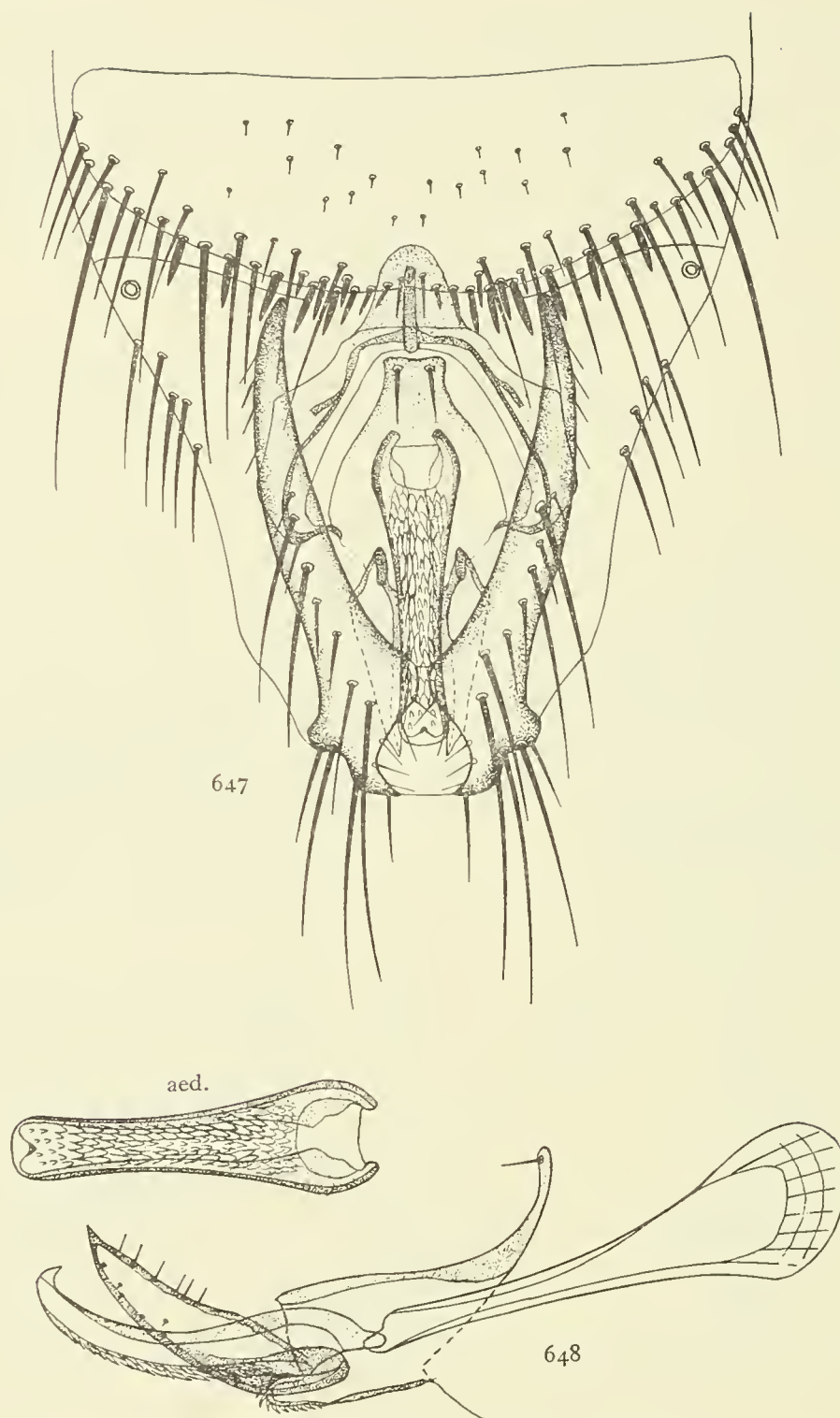
*Genitalia.* Basal arc broad, triangular. Claspers curved, with dark ends. Aedeagus tapering, slightly curved, with a dorsal tooth at the tip and scale-like teeth on the greater part of the ventral surface. Parameres slender, triangular, with a sharp apical end and a few minute hairs on the dorsal margin.



Figs. 645, 646. *Penicillidia jenynsii* (Westwood). Female. 645. abdomen, dorsal, with genital plates; 646. same, ventral.

*Female abdomen.* Tergite 1 rounded, with 2 groups of 2-4 moderately long setae in the middle of the posterior margin. Tergal plate 2 with a marginal row of long setae in the middle and shorter setae laterally; a group of short setae on the surface which may be absent. Tergal plate 3 broad, with a marginal row of long and short setae, bare on the surface. Anal segment conical, with short hairs on the dorsal surface near the base. Connexivum between the tergal plates bare. Sternite 1 + 2 with a ctenidium of about 30 spines as in the male. Sternite 5 with obliquely placed, elliptical lateral sclerites. Sternites 6 and 7 fused, but the chaetotaxy of sternite 6 is





Figs. 647, 648. *Penicillidia jenynsii* (Westwood). Male. 647. sternite 5 and genital area; 648. genitalia, profile, with dorsal view of aedeagus.

similar to that of sternite 5. Sternite 7 with rounded posterior processes with long setae. A dense group of setae on the pleurae between sternites 5 and 6. Dorsal genital plate triangular, without setae. Ventral plate narrow.

Distribution: China (type locality), Japan, Formosa. Records from Ceylon and India refer

to *P. indica*, from the Philippines to *P. oceanica acuminata* and *P. oligacantha* and from Sumatra to a form related to *P. oligacantha*.

MATERIAL IN THE COLLECTION

FORMOSA

Tainan, from *Miniopterus schreibersi*, Oct. 1906,  
H. Sauter, ♀ allotype described by Scott and circ.  
35 ♂ ♀ (Brit. Mus. 1913.489 and 1922.313).

JAPAN

Tano, Miazaki, Kyushu, from *Miniopterus schreibersi*  
*fuliginosus*, 3.v. 1905, M. P. Anderson, Duke of  
Bedford Expedition to Japan, N. C. Rothschild, 5 ♂  
3 ♀.

HOST SYNONYMY

Name on original label

*Miniopterus schreibersi japoniae* Thomas.

Current name

*M. schreibersi fuliginosus* Hodgson.

***Penicillidia leptothrinax* Speiser, 1908**

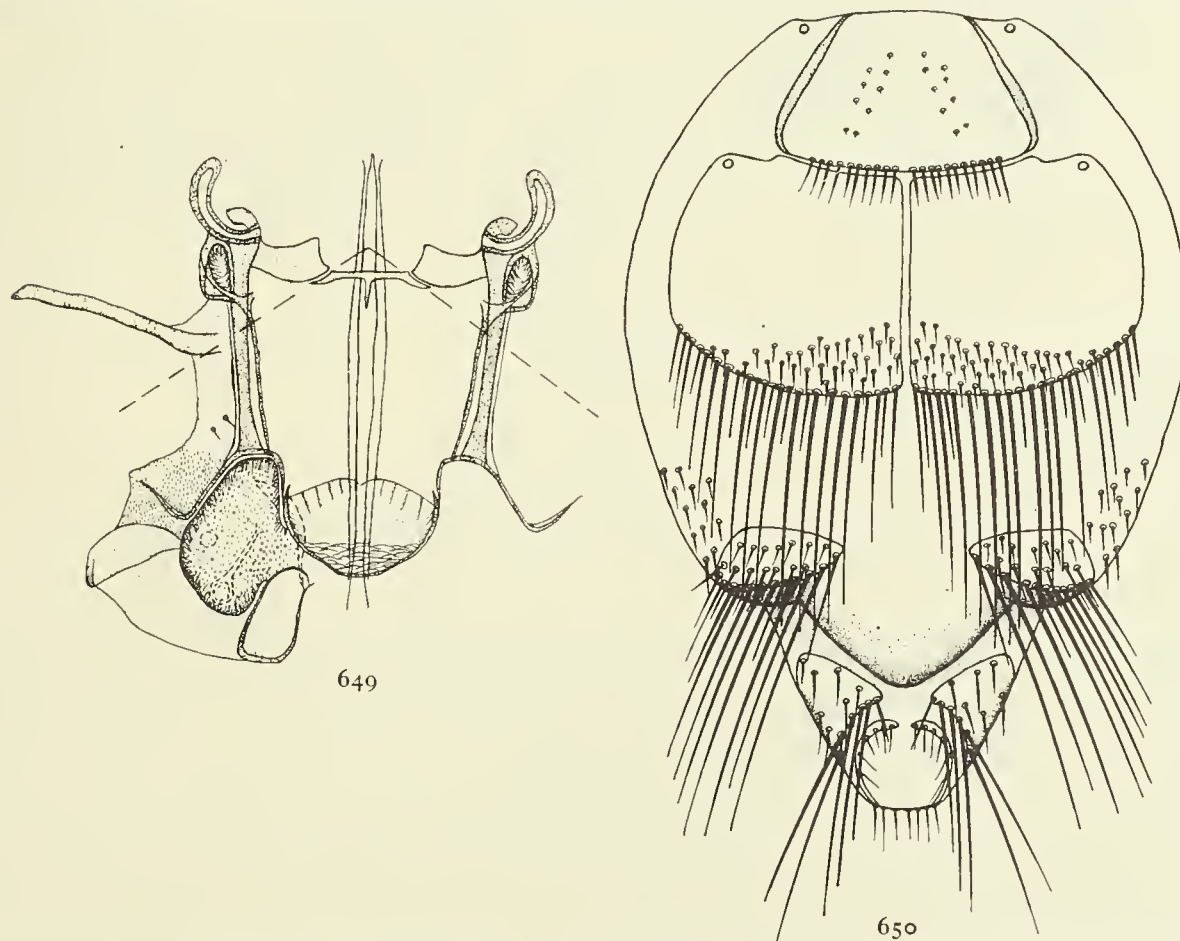
(Figs. 649–654)

*Penicillidia leptothrinax*. Speiser, 1908, in Voeltzkow, *Reise in Ostafrika*, **2**, 197.

*Penicillidia leptothrinax* Speiser. Theodor, 1957, *Parasitology*, **47**, 457.

Length 2.5–3 mm. Colour yellowish brown, head darker brown.

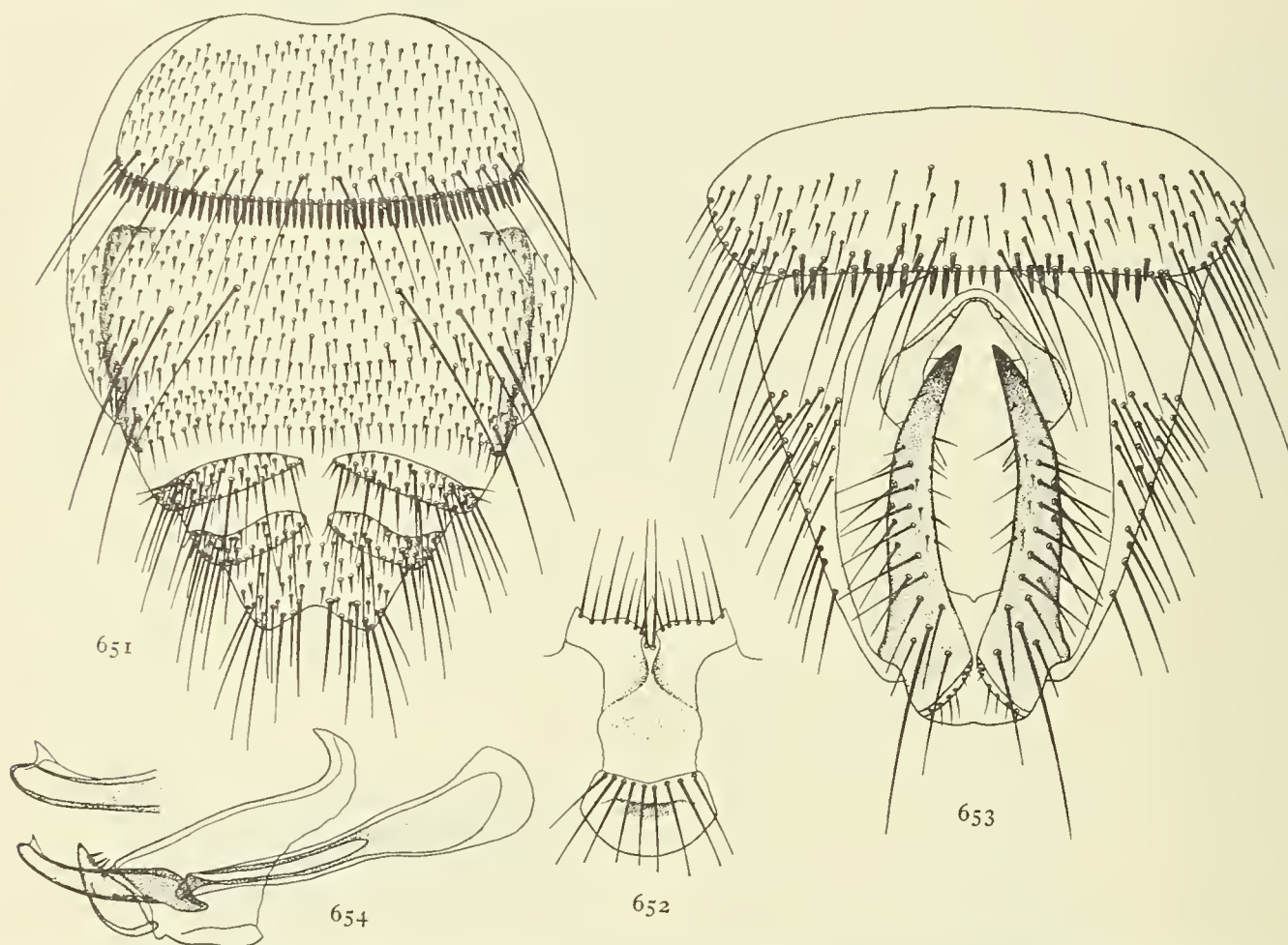
*Head*. Eyes large. About 5 rows of setae between the eyes. A row of short setae with a long seta in the middle at the anterior ventral margin and 2–3 rows of short spines near the marginal



Figs. 649, 650. *Penicillidia leptothrinax* Speiser. 649. dorsal pattern of thorax; 650. female abdomen, dorsal.

row. Labella of the proboscis about half as long as the theca. Terminal seta of the palps very long.

*Thorax.* Markedly wider than long. Length to width = 3 : 4. Sternal plate strongly convex in the longitudinal direction. Angle of the oblique sutures  $95^\circ$ . Lateral plates of the notopleural sutures narrow. 2-3 short, thin notopleural setae which are absent in some specimens. Anterior surface of femur 1 covered with setae in the apical two-thirds; femur 2 and 3 only with 3-4 rows of setae near the apical end. Tibiae slender, parallel-sided, 4 times as long as wide, with 4 rows of setae in the distal half of the ventral margin.



Figs. 651-654. *Penicillidia leptothrinax* Speiser. 651. female abdomen, ventral; 652. genital plates; 653. male sternite 5 and genital area; 654. male genitalia, with tip of aedeagus more highly magnified.

*Male abdomen.* Tergite 1 with a marginal row of about 12 setae in the middle. Tergite 2 with a marginal row of moderately long setae. Tergites 3-6 with marginal rows of very long and shorter setae. Surface of tergites 2-6 covered with short setae. Tergites 5 and 6 are very short, strip-like, with concave anterior margin. Anal segment conical, with concave anterior dorsal margin and a row of long setae around the anus. 2-3 rows of short setae anterior to this row and at the sides. Sternite 1 + 2 rectangular, with a ctenidium of about 40 closely placed spines of uniform size. 2-3 long setae at the sides of the ctenidium. Sternite 5 with a double row of spines, about 15-20 longer spines in the posterior row and about 10 shorter spines alternating with setae in the anterior row. Surface covered with short setae in the posterior two-thirds.



*Genitalia.* Basal arc with moderately wide lateral flaps and without anterior process. Claspers thin, curved, with dark, blunt ends. A very long seta dorsally near the base and several rows of shorter setae in the basal two-thirds. Phallobase concave dorsally, depressed dorso-ventrally. Aedeagus slightly curved, tapering, with a blunt tip and a long, subapical dorsal tooth. Some scale-like teeth at the ventral surface. Apodeme with a wide end-plate. Parameres triangular, with 4–5 hairs at the dorsal margin.

*Female abdomen.* Tergite 1 triangular, with a marginal row of 14–20 spines with a gap in the middle in most specimens, but without such a gap in a few. Tergal plate 2 broad, rounded, divided in the middle, with a marginal row of very long setae alternating with spines and a few shorter setae in the middle. Short setae on the posterior part of the surface. Tergal plate 3 divided into widely separated, elliptical lateral sclerites. They bear a row of long setae at the posterior margin and spines on the surface. Anal segment short, conical, divided on the dorsal surface. Long setae surround the anus and there are short setae on the dorsal surface. Connexivum between the tergites bare. Pleurae with short spines. Sternite 1 + 2 trapezoidal, with a ctenidium of about 50 closely placed spines of uniform size and 2–3 long setae laterally. Surface covered with short spines and a premarginal row of about 15 long, vertical setae. Sternites 3 and 4 with marginal rows of short setae. Sternites 5 and 6 with elliptical, obliquely placed lateral sclerites with long setae posteriorly and short setae on the surface. Sternite 7 undivided, with two posterior lobes with long setae and short setae on the surface. Dorsal genital plate rounded, with a row of about 10 setae at the base.

#### MATERIAL IN THE COLLECTION

##### MADAGASCAR

Ambohimitombo, from *Myotis goudotii*, Nov. 1894, F. Major, N. C. Rothschild, 2 ♀ (Brit. Mus. 1913.450).

Imasindrary, N.E. Betsileo, from *Miniopterus schreibersi natalensis*, F. Major, N. C. Rothschild, 1 ♂ 1 ♀ (Brit. Mus. 1913.450).

Nossi Bé, from *Miniopterus schreibersi*, 1 ♂ (Brit. Mus. 1911.103).

#### HOST SYNONYMY

Name on original label	Current name
<i>Miniopterus scotinus</i> Sundeval.	<i>Miniopterus schreibersi natalensis</i> Smith (possibly <i>M. manavi</i> Thomas or <i>M. majori</i> Thomas).

### **Penicillidia miriamae** n.sp.

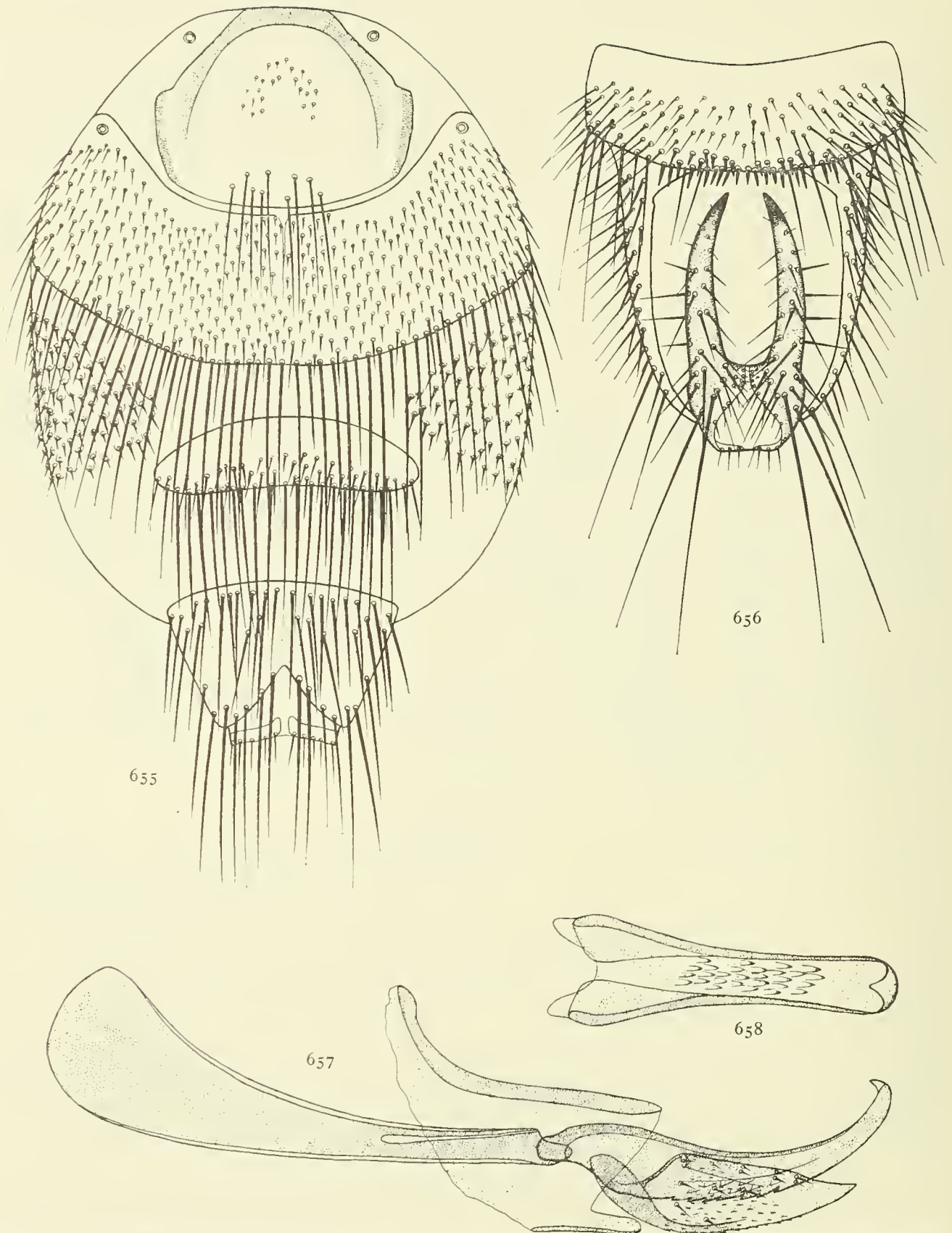
(Figs. 655–658)

Length 3.5 mm. Colour dark brown.

*Head.* 5–6 rows of moderately long setae between the eyes, reaching beyond them posteriorly. Eyes well developed, projecting from the surface. Anterior ventral margin with a double or triple row of short setae. Labella of the proboscis shorter than the theca.

*Thorax.* Length to width = 3 : 4. Notopleural setae absent. Tibiae 5 times as long as wide, with 4 rows of setae in the distal part of the ventral margin.

*Male abdomen.* Tergites 1 and 2 fused. Tergite 2 with a dense marginal row of moderately long setae. Tergites 3–6 short, with dense marginal rows of very long and strong setae, about 25 on the anterior tergites and about 15 on the posterior tergites. Tergites 5 and 6 very short, strip-like, with a concave anterior margin. Surface of tergites 2–6 covered with short setae.



Figs. 655-658. *Penicillidia miriamae* n. sp. 655. female abdomen, dorsal; 656. male sternite 5 and genital area; 657. male genitalia; 658. aedeagus, dorsal.

Anal segment short, conical, covered with moderately long setae on the dorsal surface and laterally. Sternite 1 + 2 trapezoidal, with a ctenidium of 28–30 short, ordinary spines which are shorter in the middle. A few long setae lateral to the row of spines. Surface covered with short setae and there is a premarginal row of long setae. Sternites 3 and 4 with marginal rows of longer setae laterally and shorter setae in the middle. Surface covered with short setae. Sternite 5 with posterior margin slightly concave in the middle, with a group of 33–36 long spines in 2 rows, the median spines shorter.

*Genitalia.* Claspers curved, tapering to long, dark points, with several long setae dorsally near the base and shorter setae in the basal half. Basal arc triangular, with rounded sides, narrow. Aedeagus parallel-sided in dorsal view in the apical two-thirds and with scale-like teeth in the basal two-thirds of the ventral surface, curved, tapering and with a dorsal tooth at the tip in side view. Parameres triangular, with sharply pointed apical end and with a row of short hairs on the dorsal margin, the median part of the outer surface covered with minute hairs.

*Female abdomen.* Tergite 1 transversely elliptical, with a group of about 12 moderately long setae in 2 rows on the surface near the posterior margin. Tergal plate 2 large, rounded, with a marginal row of long and strong setae which become only slightly shorter laterally. Surface completely covered with short setae. Tergal plate 3 incompletely divided in the middle and with a marginal row of long setae like those on tergal plate 2 and with 2–3 rows of short setae on the surface. Anal segment short and wide, conical, covered with moderately long setae dorsally. Pleurae covered with short setae and spines. Sternite 1 + 2 large, rounded, with a ctenidium of about 25 short, ordinary spines which are shorter and more widely spaced in the middle. They alternate with longer setae laterally and with shorter setae in the middle. Surface covered with short setae and there is a premarginal row of long setae. Sternite 5 with obliquely placed, elliptical lateral sclerites with long setae in the posterior lateral corners and with shorter setae towards the middle and on the surface. Sternites 6 and 7 fused. The arrangement of the setae on sternite 6 resembles that on sternite 5. Sternite 7 with 2 rounded posterior lobes which bear thick brushes of setae. Genital plate triangular, with several setae at the base.

*P. miriamae* resembles *P. oligacantha* in the absence of notopleural setae but differs in the chaetotaxy of the abdomen in both sexes. It resembles *P. jenynsii* in the arrangement of the setae on the abdomen, but differs from it in the arrangement of the setae on tergite 1 of the female and in the absence of notopleural setae in both sexes and the form of the parameres in the male.

This species is named in honour of the Hon. Miriam Rothschild.

MATERIAL IN THE COLLECTION

SOLOMON ISLANDS

Tekagipuli cave, Rennell Island, from *Dobsonia inermis*, 8.xi. 1953, J. D. Bradley, ♀ holotype, 2 ♂ paratypes (Brit. Mus. 1954.222).

**Penicillidia oceanica oceanica** (Bigot, 1885)

(Figs. 659–663, 665, 666, 668)

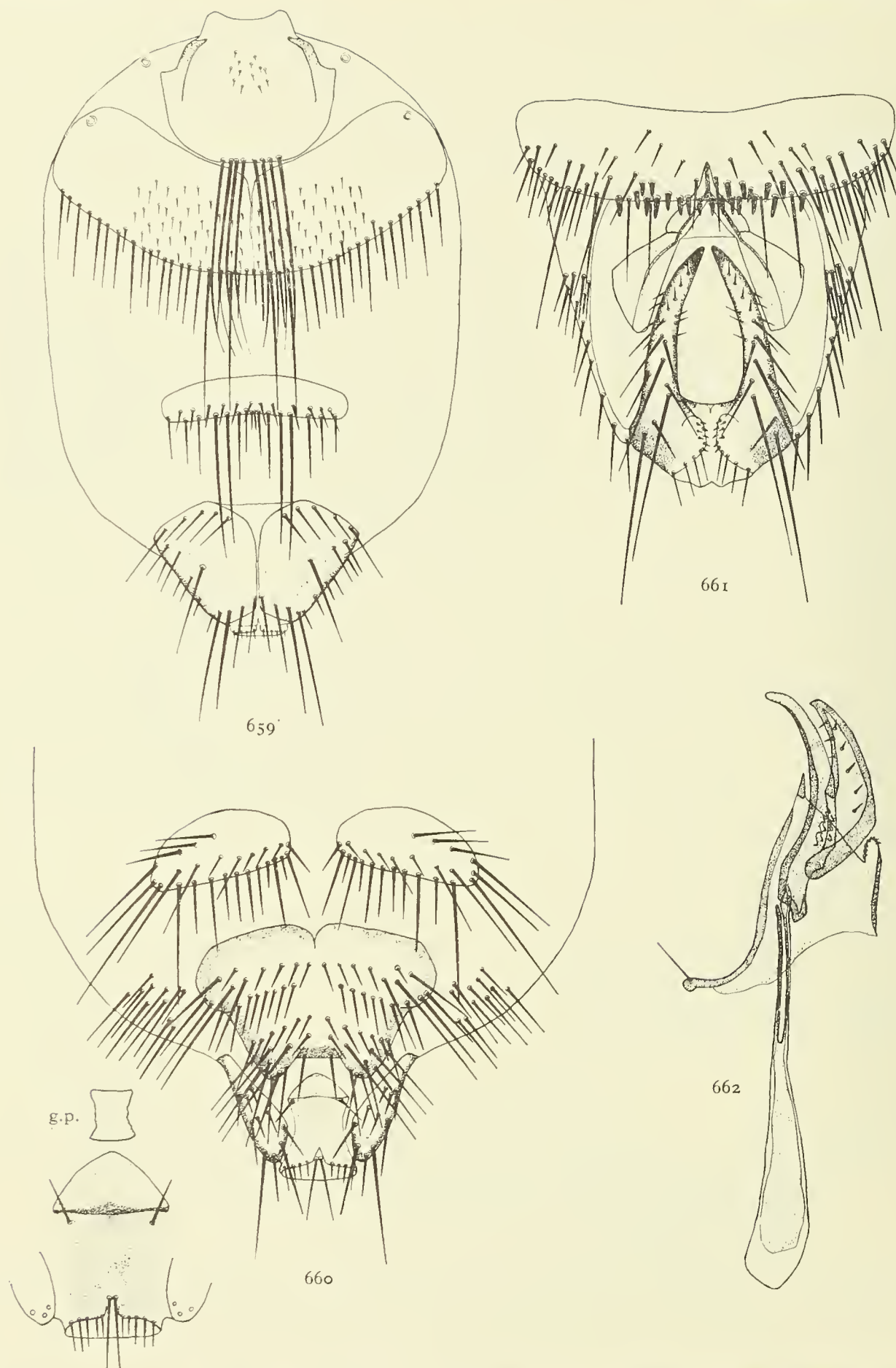
*Nycteribia oceanica*. Bigot, 1885, *Ann. Soc. Ent. France*, **5**, 246.

nec *Nycteribia oceanica* Bigot. Speiser, 1901, *Arch. Naturgesch.* **67**, 11 (refers to *Basilina (Tripselia) falcozi*).

*Penicillidia oceanica* (Bigot). Falcoz, 1923, in Sarasin & Roux, *Nova Caledonia (Zool.)*, **3**, 83.

*Penicillidia oceanica* (Bigot). Scott, 1932, *Stylops*, **1**, 16.





Figs. 659-662. *Penicillidia oceanica oceanica* (Bigot). 659. female abdomen, dorsal; 660. same, ventral, posterior part, with genital plates; 661. male sternite 5 and genital area; 662. male genitalia.

Length 2.5 mm. Colour yellowish brown. Head with 3 rows of setae between the eyes, not reaching behind the eyes. Eyes large, unpigmented. A single row of short setae at the anterior ventral margin. A longer seta in the ventral part of this row. Labella of the proboscis about half the length of the theca.

*Thorax.* Wider than long, length to width = 4:5. Median ventral suture well marked, narrow. Angle of oblique sutures 90°. Notopleural setae absent. Thoracic ctenidium with 10–12 pointed spines. Tibiae 6 times as long as wide.

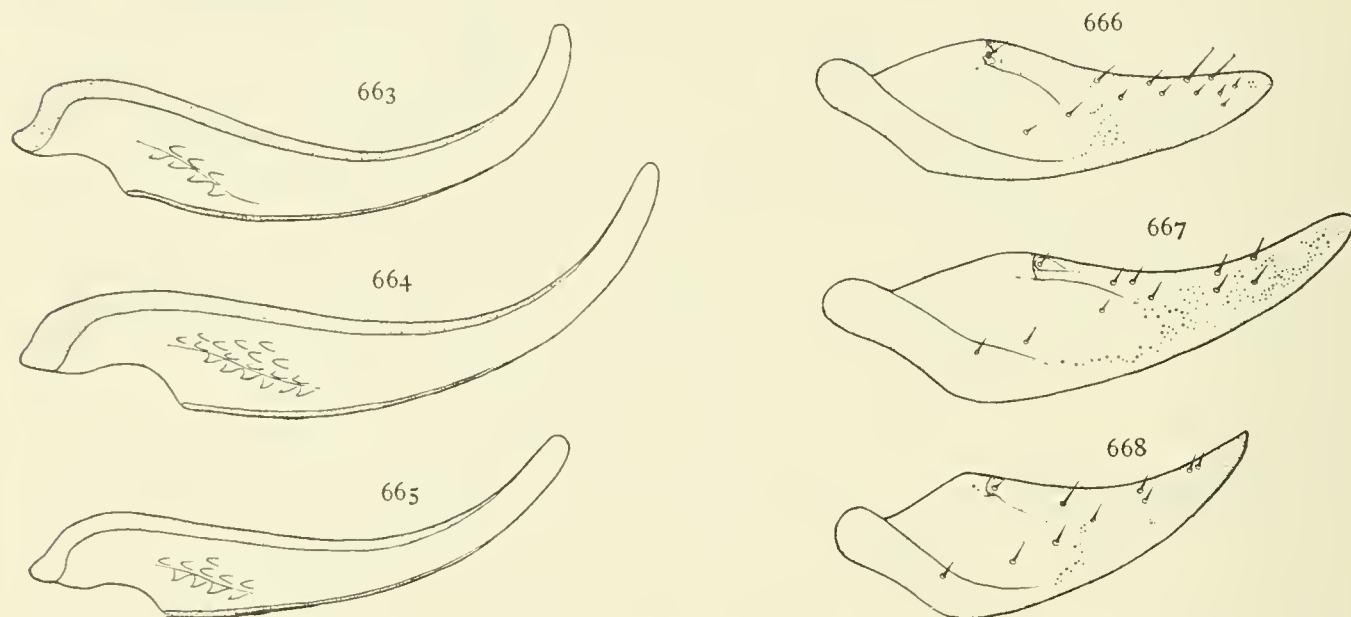
*Male abdomen.* Tergites 1 and 2 fused. Tergite 2 with a marginal row of moderately long, thin setae and short setae in the lateral posterior parts of the surface. Tergites 3–6 with marginal rows of long and strong setae, particularly in the middle. Surface of tergite 3 covered with short setae. Tergites 4–6 very short, with 1–2 rows of short setae on tergite 4 and a premarginal row on tergites 5 and 6. Anal segment short, conical, with concave anterior dorsal margin. 2–3 rows of short setae on the posterior part of the dorsal surface and longer setae posteriorly, the lateral setae very long. Sternite 1 + 2 short, with a ctenidium of 16–18 short, ordinary, widely spaced spines which are markedly longer laterally than in the middle. Surface with short hairs and a premarginal row of moderately long, thin setae. Sternites 3 and 4 with marginal rows of short setae in the middle and longer setae laterally. Surface bare except for a few short setae at the lateral corners. Sternite 5 longer, with a group of about 25 spines in 2 rows at the posterior margin. These spines are markedly longer than in *P. buxtoni*. Moderately long, thin setae lateral to the group of spines and 2–3 rows of setae on the surface, some of the premarginal setae long.

*Genitalia.* Basal arc triangular, with lateral flaps. Claspers curved, with dark ends. 2–3 long setae dorsally near the base and several rows of shorter setae in the basal two-thirds. Aedeagus curved, tapering to a blunt end, without dorsal apical tooth, triangular in dorsal view, with a few large, scale-like teeth in the basal part of the ventral surface. Parameres slender, triangular, with a sharp apical point in most specimens. This point is drawn out into a long, thin process in some specimens. Phallobase slender, with 2 setae at the base.

*Female abdomen.* Tergite 1 rounded posteriorly, with a row of 8–10 long, curved setae in the middle of the posterior margin. Tergal plate 2 divided in the middle, with a marginal row of short setae and 5–6 long setae in the middle of the row. A group of short setae in the middle of the surface and some setae laterally in some specimens. The median group varies in size. Tergal plate 3 undivided, transversely elliptical, with a marginal row of long vertical setae in the middle and shorter horizontal setae laterally. There is a premarginal row of short vertical setae on the surface. Anal segment short, conical, divided in the middle, with 1–2 rows of setae at the anterior margin and at the sides, and a row of setae posteriorly which are longer laterally. Sternite 1 + 2 with a marginal row of long setae which are widely spaced. Ctenidium much reduced, with only 4–5 short spines at each side between the setae. There are no spines in the median third, where there are instead short, thin setae. Sternites 3 and 4 with short setae on the surface and marginal setae which are not much longer than the setae on the surface. 4–5 rows of setae on sternite 3, only a single row on sternite 4. 6 long vertical setae in a curved row on sternite 3 and only 1 seta at each side on sternite 4. Sternite 5 with obliquely placed, elliptical lateral sclerites with marginal rows of moderately long setae in the middle and longer setae laterally. A double row of vertical setae on the surface. Sternites 6 and 7 fused, the arrangement of the setae on sternite 6

similar to that on sternite 5. Sternite 7 with rounded posterior processes, with long setae posteriorly and short, vertical setae on the surface. Genital plate triangular, with 2 setae at the base, connected by a sclerotized strip with the ventral ends of the anal frame which are markedly widened. 2 setae between the ventral ends of the anal frame. A group of setae on the pleurae between sternite 7 and the anal segment.

Australian specimens differ in some details from those from New Caledonia and may eventually prove a separate subspecies.



Figs. 663-668. *Penicillidia oceanica oceanica* (Bigot). Aedeagus of specimen from: 663. Australia; 664. *P. oceanica acuminata* Theodor; 665. *P. oceanica* from New Caledonia; paramere of specimens from: 666. Australia; 667. *P. oceanica acuminata* Theodor; 668. *P. oceanica* from New Caledonia.

MATERIAL IN THE COLLECTION

NEW CALEDONIA

♂ holotype, 1 ♀ paratype of Bigot.

AUSTRALIA

Townsville, 1927, G. Dennes, 2 ♂ 1 ♀ (Brit. Mus. 1931.202).

Mossman, from *Miniopterus schreibersi*, F. Muir, no. 471, 1 ♂ 2 ♀.

Cairns, from *Pteropus conspicillatus*, Nov. 1902,

W. Y. H. Rosenberg, N. C. Rothschild, 1 ♂.

Cape York, from *Miniopterus schreibersi*, 21.v. 1912,

R. Kemp, N. C. Rothschild, 1 ♂ 1 ♀.

Gordonvale, N. Queensland, Illingsworth, 1 ♂.

ISLANDS OF TORRES STRAIT

From *Miniopterus schreibersi*, Rev. Macfarlane, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

***Penicillidia oceanica acuminata* Theodor, 1963**

(Figs. 664, 667, 670)

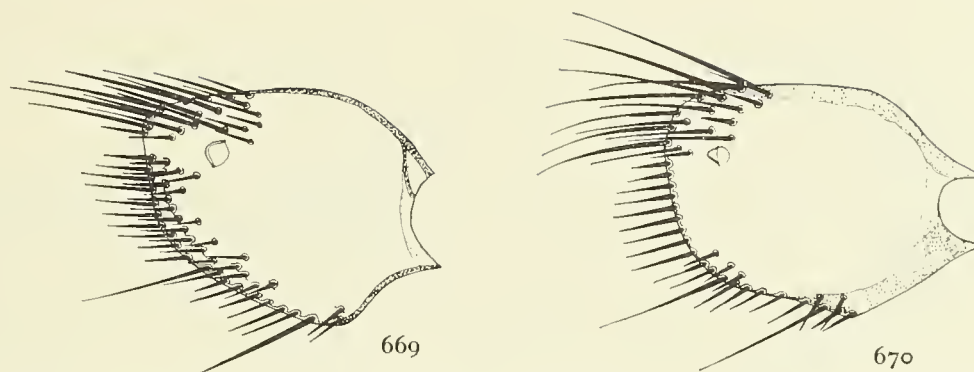
*Penicillidia jenynsii* Westwood. Ferris, 1924, *Phil. Jour. Science*, **25**, 391 (*pro parte*).

*Penicillidia oceanica acuminata*. Theodor, 1963, *Feldiana*, Zool. **42**, 151.

Specimens of *P. oceanica* from the Philippines differ from the typical form in being more setose, the abdominal setae being longer and thicker. The male genitalia differ in the aedeagus being longer, more tapering and curved, and the parameres are more slender.

Type series in the Chicago Natural History Museum.





Figs. 669, 670. Head of: 669. *Penicillidia oligacantha* Theodor; 670. *P. oceanica acuminata* Theodor.

MATERIAL IN THE COLLECTION

PHILIPPINES

Tablas Island, from *Miniopterus schreibersi eschscholtzi*, Jan. 1923, E. H. Taylor, N. C. Rothschild, 5 ♂ 5 ♀ paratypes.

***Penicillidia oligacantha* Theodor, 1963**

(Figs. 644, 669, 671-673)

*Penicillidia jenynsii* (Westwood). Ferris, 1924, *Phil. Jour. Science*, **25**, 391 (*pro parte*).

*Penicillidia oligacantha*. Theodor, 1963, *Fieldiana, Zool.* **42**, 151.

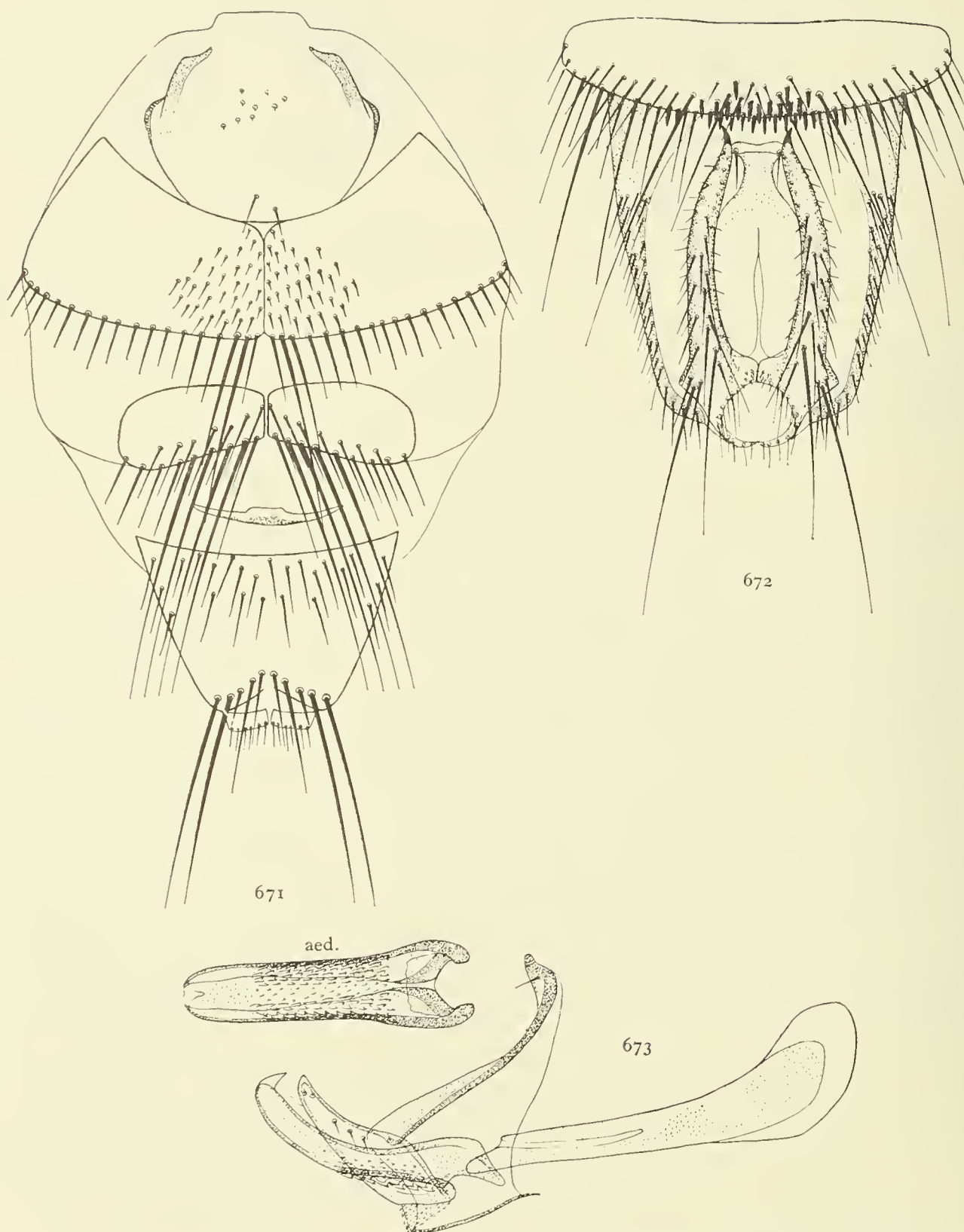
Length 2.5-3 mm. Colour brown. Head with a dense group of setae between the eyes. A double row of short setae at the anterior ventral margin of the head. Palps with a long terminal seta near the tip. Labella of the proboscis about half the length of the theca.

*Thorax*. Wider than long. Notopleural setae absent. Tibiae 5-6 times as long as wide, with 3 rows of setae at the distal part of the ventral margin.

*Male abdomen*. Tergites 1 and 2 fused. Tergite 2 with a dense marginal row of moderately long, thin setae. Tergites 3-6 short, with similar marginal rows but in addition with 4-6 very long and thick setae in the marginal rows. Surface of the tergites covered with short setae. Anal segment conical, with short setae on the dorsum and 2 long setae posteriorly. Sternite 1 + 2 with a ctenidium of about 30 short ordinary spines which are longer and are placed more closely together than in the female. The median spines are shorter than the lateral ones. A pre-marginal row of long setae and a few long setae lateral to the spines. Sternites 3 and 4 bare on the surface. Sternite 5 has a convex posterior margin with a group of about 30 spines in 2-3 rows. The spines of the anterior rows are shorter. Surface bare except for a premarginal row of setae.

*Genitalia*. Claspers long, thin, curved, with pigmented ends. A long seta dorsally near the base, another further apically and 2-3 rows of shorter setae in the basal two-thirds. Basal arc triangular, with narrow lateral flaps. Aedeagus curved, tapering, with a long dorsal tooth at the tip. In dorsal view it is nearly parallel-sided in the apical two-thirds. Scale-like teeth in the basal two-thirds which are more marked in 2 lateral strips. Parameres triangular, with blunt apical ends.

*Female abdomen*. Tergite 1 rounded posteriorly, either without any setae or with 1-2 short setae in the middle of the posterior margin. Surface bare except for a few minute spines. Tergal plate 2 rounded posteriorly, divided in the middle, with a marginal row of moderately long setae



Figs. 671-673. *Penicillidia oligacantha* Theodor. 671. female abdomen, dorsal; 672. male sternite 5 and genital area; 673. male genitalia, with dorsal view of aedeagus.

and some 4–6 long setae in the middle. The surface of tergal plate 2 is either covered with short setae, partly covered or bare. Tergal plate 3 divided into elliptical lateral sclerites with marginal rows of 3–4 very long setae. These are longer than the marginal setae of tergal plate 2. Anal segment conical, with short setae on the dorsal surface and a row of long setae posteriorly. Sternite 1 + 2 large, covered with short setae and with a ctenidium of 16–20 short, ordinary spines which are smaller and more widely spaced in the middle. There may be a gap in the middle of the ctenidium with setae instead of spines. There is a premarginal row of long setae. Sternite 5 with elliptical lateral sclerites covered with short setae and with some long setae laterally. Sternite 6 undivided, with 3 rows of setae which are long and vertical laterally. Sternite 7 with rounded posterior processes with long setae and short setae on the surface. Dorsal genital plate broad, triangular, with 2 short setae near the base. Ventral plate small, of irregular shape.

A male from Lian si Paghe, Sumatra, from the series of the Museum in Genoa, which was used by Speiser (1901) for his re-description of *P. jenynsii*, was re-examined. It proved to be closely related to *P. oligacantha*, but differs in details of the male genitalia. More material of both sexes of this form is necessary to define its position.

Distribution and hosts: Philippines, on *Ronsettus amplexicaudatus*, *Eonycteris spelaea glandifera*, *Miniopterus australis*, *Miniopterus schreibersi eschscholtzii*, *Rhinolophus arcuatus*.

Type series in the Chicago Natural History Museum.

#### MATERIAL IN THE COLLECTION

##### PHILIPPINES

Tablas Island, from *Miniopterus schreibersi eschscholtzii*, Jan. 1923, E. H. Taylor, N. C. Rothschild, 4 ♂ 6 ♀ paratypes.

#### *Penicillidia spinifera* n.sp.

(Figs. 674–676)

Length 2.25–2.5 mm. Colour yellowish.

*Head.* 5–6 rows of moderately long setae on the vertex which reach well behind the eyes and 2–3 rows of short setae behind the group of long setae. Palps very slender, with only 5 or 6 long setae in their apical part and short setae basally. Labella of the proboscis about half as long as the theca. Eyes small.

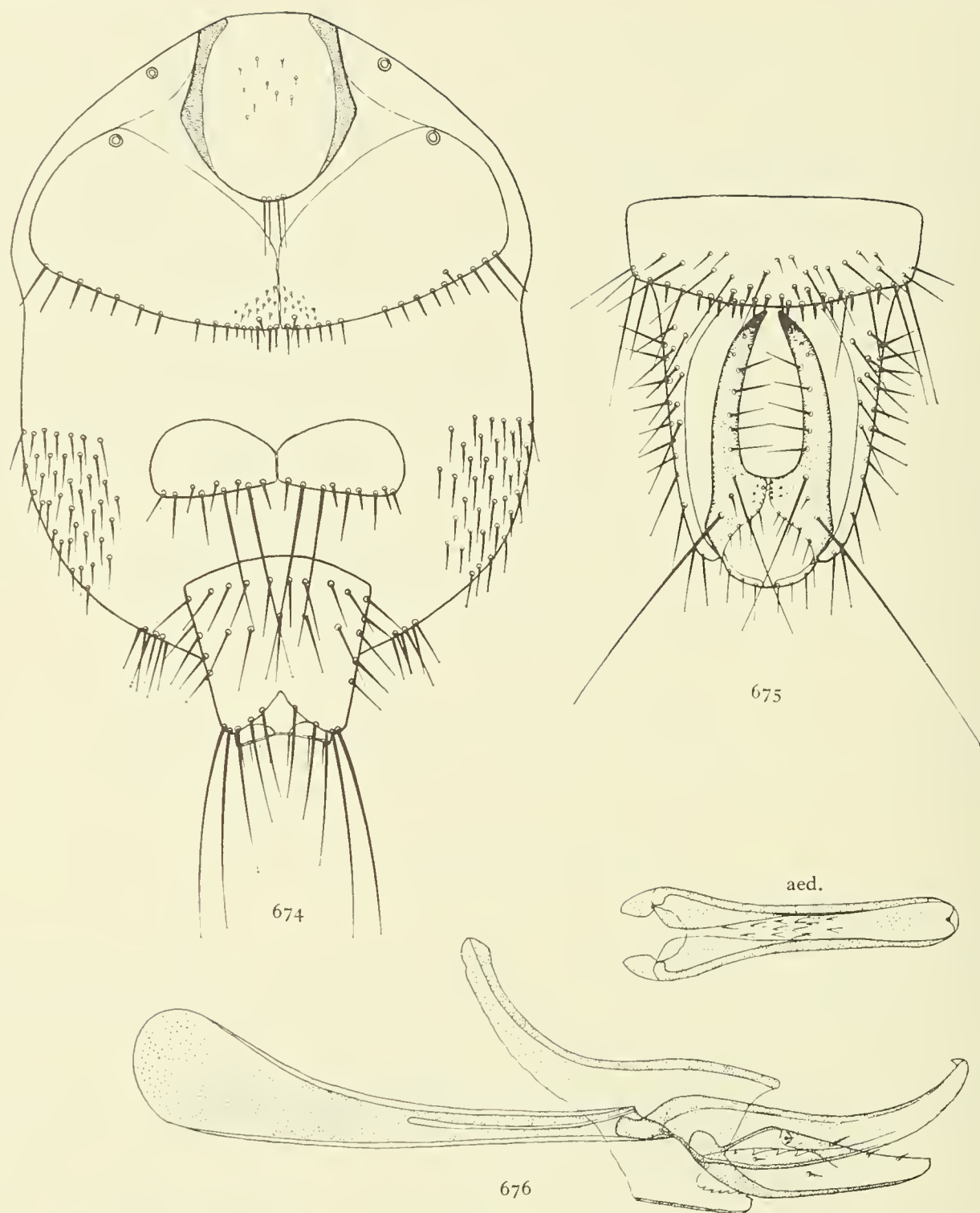
*Thorax.* As in *P. buxtoni*, except that there are about 9–12 long notopleural setae in an irregular double row in the female, and 6–9 shorter and thinner setae in the male. Legs as in *P. buxtoni*.

*Male abdomen.* In general as in *P. buxtoni* but more slender. Abdominal ctenidium with about 10 short spines which are very small or absent in the middle. Sternite 5 only slightly convex posteriorly with a group of about 16–20 spines in a double row which may be single in the middle.

*Genitalia.* In general as in *P. buxtoni*. Claspers very slender, curved, with dark points. Basal arc triangular, with lateral flaps. Aedeagus parallel-sided in dorsal view in the apical two-thirds, widening to twice its apical width at the base, curved and tapering in side view and with a dorsal tooth at the tip. Parameres slender, with blunt tips and a few minute hairs at the dorsal edge.

*Female abdomen.* Tergite 1 rounded posteriorly, as long as wide, with a group of 4–5 short, thin setae in the middle of the posterior margin. Tergal plate 2 short, divided in the middle,





Figs. 674-676. *Penicillidia spinifera* n. sp. 674. female abdomen, dorsal; 675. male sternite 5 and genital area; 676. male genitalia, with dorsal view of aedeagus.

with a row of spines at the posterior margin which are widely spaced laterally and stand more closely in the middle. Two spines near the median division line are longer than the others. Only 2 short setae in the marginal row at the lateral posterior corners. Surface bare in most specimens, a few short hairs in the middle posteriorly in a few. Tergal plate 3 divided in the middle, the lateral sclerites touching each other even in distended specimens. They have a

marginal row of 1–3 long setae towards the middle, and shorter setae and spines laterally. Surface bare. Pleurae with a group of short setae between tergal plate 3 and sternites 3 and 4, bare anteriorly. Anal segment short, conical, with 2–3 rows of short setae dorsally near the base and a row of long setae around the anus. Sternite 1 + 2 large, rounded posteriorly with a strongly reduced ctenidium as in *P. buxtoni*, consisting of only 2–3 short spines at each side of the posterior margin. 3–4 long setae at the lateral posterior corners and shorter, more widely spaced setae in the middle. Ventral surface otherwise as in *P. buxtoni*, but the setae are shorter and less numerous. Genital plate triangular with 2 setae at the base.

This species is closely related to *P. buxtoni*, from which it differs in its smaller size, the absence of long setae in the middle of the marginal row of tergal plate 2 and the absence of short hairs on its surface in the female and in the arrangement and number of spines of the group on sternite 5 and the shape of the aedeagus in the male.

## MATERIAL IN THE COLLECTION

## SOLOMON ISLANDS

Tekanilakulaku cave, Hutuna, Rennell Island, from *Miniopterus australis*, 5.xi. 1953, J. D. Bradley, ♀ holotype, 3 ♂ 3 ♀ paratypes (Brit. Mus. 1954. 222).

## OTHER MATERIAL EXAMINED

## SOLOMON ISLANDS

Lavangu, Rennell Island, from bat, 10.xi. 1951, Galathea Expedition, Zool. Museum, Kopenhagen, L.356, 1 ♀ paratype.

SUBGENUS **EREMOCTENIA** Scott, 1917

*Eremoctenia*. Scott, 1917, *Parasitology*, 9, 593. Type species: *Eremoctenia progressa*, Scott, 1917.

This was created as a genus for *Eremoctenia progressa* because of the absence of eyes, of thoracic and abdominal ctenidia. Scott mentions that the species resembles a *Penicillidia*. *Eremoctenia progressa* possesses all important characters of the genus *Penicillidia*, such as presence of covers on the haltere groove, absence of a post-spiracular sclerite, form of the head and the tibiae, fusion of the oblique sutures of the sternal plate of the thorax, structure of the male genitalia and of the genital plate in the female, except for the absence of the thoracic ctenidia. Reduction of the abdominal ctenidium is very marked in some species of *Penicillidia* and a species without ctenidium in the female has been described above. Reduction of the thoracic ctenidium is also marked in some species of the genus. Lack of the thoracic ctenidia is unique among the Nycteribiidae, but as reduction of the ctenidia is common and very pronounced in some species of the genus, the absence of a thoracic ctenidium may be considered as an extreme example of this tendency to reduction.

Examination of material of the type series has proved that eyes are present, but also in reduced form, that is, as small lenses which do not, or only very slightly, protrude from the surface and which are discernible only with difficulty in balsam preparations. The eyes are not much smaller than, for example, those of *P. buxtoni*. *Eremoctenia* is therefore here considered as a subgenus of *Penicillidia*.

*Diagnosis*. In general possessing the characters of the genus, but thoracic and abdominal ctenidia absent and the eyes are reduced.

**Penicillidia (Eremoctenia) progressa** (Scott, 1917)

(Figs. 677–681)

*Eremoctenia progressa*. Scott, 1917, *Parasitology*, 9, 593.

Length 2.3–2.5 mm. Colour yellowish.

*Head*. Broadly rounded, wider posteriorly, with 3–4 rows of setae near the anterior dorsal margin. Eyes much reduced, single unpigmented lenses. A single row of short setae at the anterior ventral margin. Labella of the proboscis about half the length of the theca.

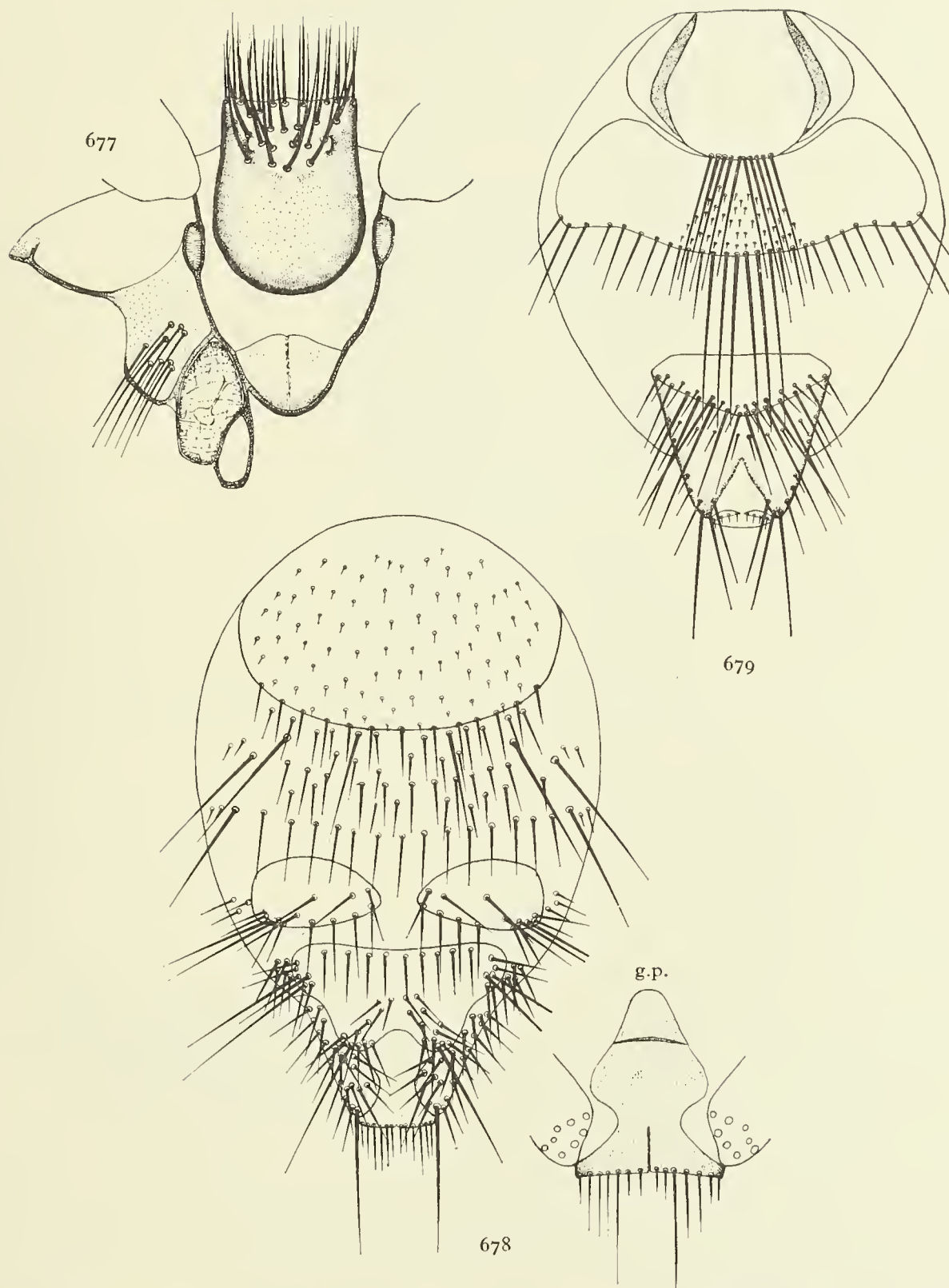
*Thorax*. Wider than long. Length to width = 2 : 3. Oblique sutures of the sternal plate fused, visible only with difficulty. Median suture well marked, little widened in the middle. Mesonotum narrowing posteriorly. Lateral plates of the notopleural sutures wide, with 6–8 notopleural setae in 2–3 rows. Tibiae slender, parallel-sided, 8 times as long as wide, with 5–6 rows of setae in the distal half of the ventral margin. Those of the distal row are long and the others very short.

*Male abdomen*. Tergites 1 and 2 fused. Tergite 2 very short, with a marginal row of moderately long and short setae and short setae on the surface. Tergites 3–6 with 6–8 very long and strong setae in the middle of the marginal rows and shorter setae laterally. Surface covered with short setae. Tergite 6 very short, strip-like. Anal segment conical, with a double row of longer and shorter setae posteriorly, 1–2 setae at the lateral corners very long. Dorsal surface bare. Sternite 1 + 2 with a marginal row of longer and shorter setae. Ctenidium absent. Sternites 3 and 4 with similar marginal rows of shorter setae in the middle and longer setae laterally. Surface bare except for a few short setae in the lateral corners. Sternite 5 triangularly produced in the middle of the posterior margin. The median process bears a group of 25–28 short spines in 3–4 rows. Long and short setae laterally in the marginal row and a premarginal row of longer and short vertical setae.

*Genitalia*. Basal arc triangular. Claspers short, curved, with dark ends; a long seta dorsally near the base and 2 rows of shorter setae in the basal two-thirds. Aedeagus short, curved, tapering to a point, with a small dorsal tooth. 2–3 rows of scale-like teeth on the ventral surface near the base. Parameres triangular, with curved ventral margin and a few short hairs on the dorsal margin. Apodeme with a narrow end-plate.

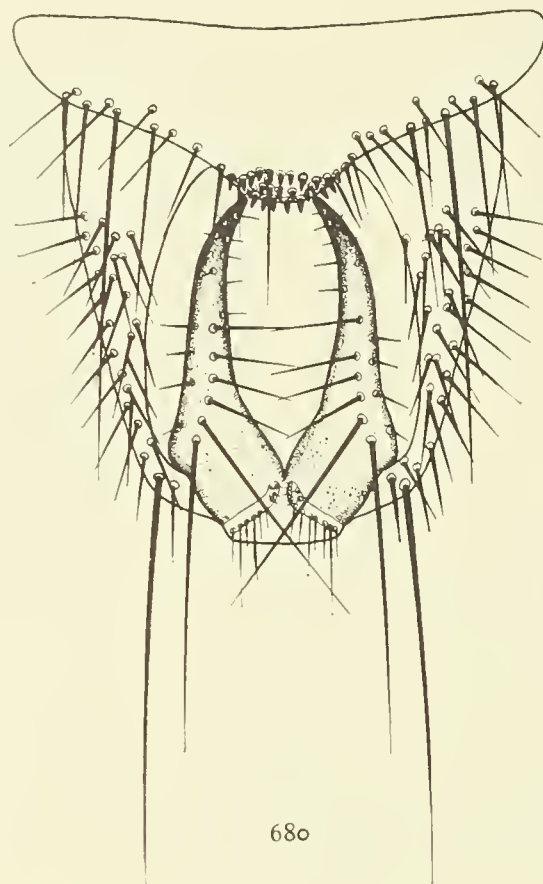
*Female abdomen*. Tergite 1 rounded posteriorly, with a marginal row of 10–15 long setae. Tergal plate 2 short, undivided, with 4–6 long setae in the middle of the marginal row and shorter and more widely spaced setae laterally. A group of short setae in the middle of the surface. Tergal plate 3 triangularly produced posteriorly, lying very close to the anal segment, with a marginal row of long and short setae and 1–2 rows of short vertical setae on the surface. Anal segment conical, with 1–2 rows of short setae near the base, short setae laterally and 1–2 long setae near the posterior lateral corners. Sternite 1 + 2 longer than in the male, elliptical, with convex posterior margin and a marginal row of only about 10–12 short, widely spaced setae in the middle. Surface covered with short setae. Sternites 3 and 4 membranous, with marginal rows of short setae and with short setae on the surface. A curved row of 6 long, vertical setae on the surface of sternite 3 and one such seta at each side on sternite 4. Sternite 5 with elliptical or triangular lateral sclerites which do not reach the midline and have a marginal row of short



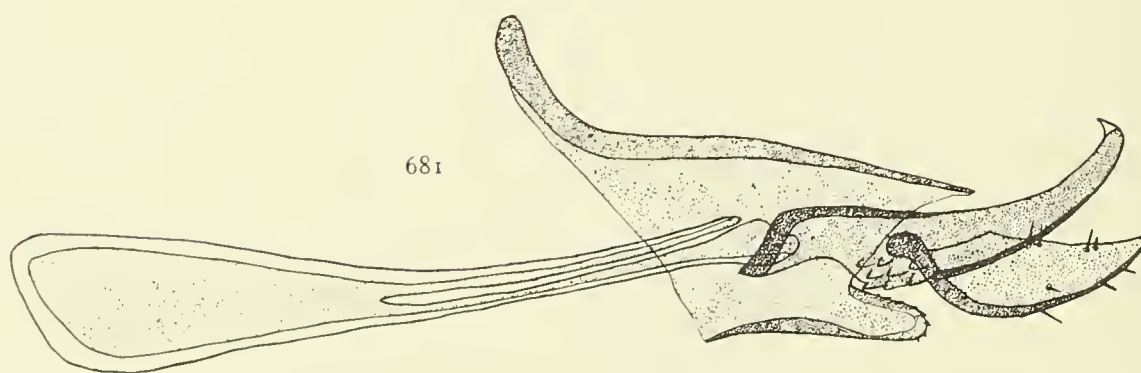


Figs. 677-679. *Penicillidia (Eremoctenia) progressa* (Scott). 677. head and dorsal pattern of thorax; 678. female abdomen, ventral, with genital plate; 679. same, dorsal.

setae towards the middle and longer vertical setae laterally; a few short vertical setae on the surface. Sternites 6 and 7 fused. Sternite 6 with a similar marginal row as sternite 5. Sternite 7 with rounded posterior processes with longer and shorter setae and several rows of short setae



680



681

Figs. 680, 681. *Penicillidia (Eremoctenia) progressa* (Scott). 680. male sternite 5 and genital area; 681. male genitalia.

on the surface. Genital plate small, triangular, without setae. A few setae on the pleurae between sternite 6 and the anal segment.

#### MATERIAL IN THE COLLECTION

##### MOLUCCAS

Amboina, from *Miniopterus schreibersi*, 1908, F. Muir, ♂ holotype, 1 ♂ 2 ♀ paratypes (Brit. Mus. 1911.289).

## Subfamily CYCLOPODIINAE n. subfam.

Head either laterally or dorso-ventrally compressed. Eyes always present. Mesonotum widening posteriorly. Mesopleural sutures originating far posteriorly, except in *Archinycteribia*. Notopleural setae reduced in number in most species, absent or more numerous in a few. Tibiae nearly cylindrical, with 2-3 rows of short setae in the middle and clearly marked bands of weaker integument near the rows of setae. Tergites 1 and 2 always fused in both sexes. Segmentation of the abdomen of the female reduced, only 2 or 3 tergites before the anal segment. Sternite 7 functioning as genital plate. Male genitalia of *Nycteribia*, *Eucampsipoda* or *Cyclopodia* type. Setae and spines coarse, spines of the ctenidia especially thick and blunt. Parasites of Megachiroptera, Old World only.

## GENUS ARCHINYCTERIBIA Speiser, 1901

*Archinycteribia*. Speiser, 1901, *Arch. Naturgesch.* 67, 11. Type species: *Archinycteribia actena* Speiser, 1901.

The genus was described from the male only. The female is here described for the first time. Speiser considered the genus as primitive, mainly because of a wrong interpretation of the segmentation of the male abdomen. *Archinycteribia* is, like the other genera of the subfamily, highly modified.

*Head*. Strongly compressed laterally, very long, nearly reaching the posterior margin of the thorax when folded backwards. Eyes either single unpigmented lenses or 4 lenses in each eye in two elliptical frames. Ventral part of the head divided by a suture near the base of the proboscis.

*Thorax*. Wider than long. Median sternal suture well marked. Oblique sutures fused, meeting the median suture at right angles. Anterior margin of the sternal plate forming a triangular vertical process between coxae 1 which bears 2 short setae at the tip. Thoracic ctenidia with thick, truncate spines with secondary striations. Mesonotum elliptical, 2-3 short notopleural setae in front of the haltere groove which is open. Mesopleural sutures not joining the notopleural sutures, but running along the outer margin of the lateral plates of the notopleural sutures and parallel to them, reaching to the anterior margin of the haltere groove. Legs short. Coxae 1 triangular, with a row of setae posteriorly. Tibiae cylindrical, with 3 rows of short setae in the distal half near the middle and with 3 well-marked rings of weaker integument near the setae. Basitarsi very short, about as long as the next 3 tarsal joints.

*Abdomen*. Post-spiracular sclerite broadly triangular, with 1-2 setae. Tergites 1 and 2 fused. Abdomen of the male with normal segmentation. (Speiser thought that sternites 4 and 5 in *Archinycteribia* are not fused, while they are fused in all other genera of Nycteribiidae, and interpreted this as indicating the primitive character of *Archinycteribia*. This, in our view, is not correct and the segmentation of the male abdomen in *Archinycteribia* is the same as in other genera.) Abdominal ctenidium absent in both sexes. Segmentation of the female abdomen much reduced. There is only a basal tergite formed by the fused tergites 1 and 2 and tergite 6 in front of the anal segment. On the ventral surface, sternite 1 + 2 and sternites 6 and 7 are



present. Posterior margins of sternites 3, 4, and 5 indicated by rows of setae. Genital plates absent. Male genitalia of *Nycteribia* type with sclerotized aedeagus. Endophallus present or absent. Basal arc triangular, with a very long anterior process. Parameres triangular in one species, absent in another.

***Archinycteribia actena* Speiser, 1901**

(Figs. 682–692)

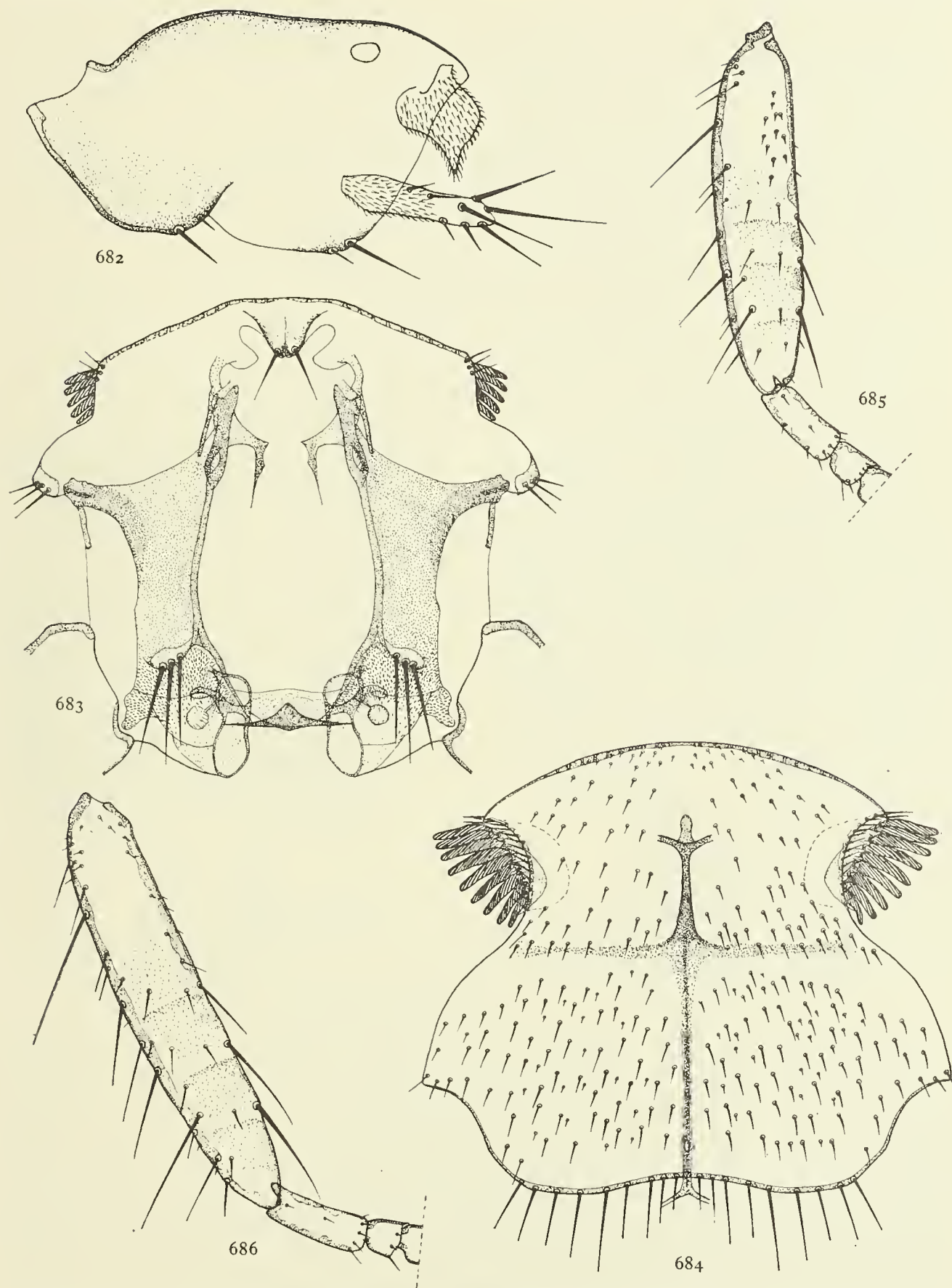
*Archinycteribia actena*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

Length 2–2.5 mm. Colour brown.

*Head*. Long, strongly compressed laterally, anterior margin curving down over the antennae. Dorsal surface bare in the specimens examined. Speiser mentions the presence of a few short hairs between the eyes. A large, elliptical, unpigmented lens rather far (3 times its length) from the anterior margin. A short seta and a spine at the anterior angle of the ventral margin and a seta and a spine at the ventral posterior suture. Palps with 3–4 moderately long setae at the tip and several short setae further basally. Arista of antenna elaborately branched. Labella of the proboscis about half the length of the theca.

*Thorax*. Length to width = 5 : 7. Sides of the sternal plate deeply hollowed near the thoracic ctenidia. A triangular process with 2 setae at the tip between the 2 fore-coxae at the anterior margin. Median sternal suture widened in the middle. Oblique sutures fused, joining the median suture at right angles. Minute hairs among the short setae of the surface. A uniform row of setae at the posterior margin. Mesonotum elliptical, slightly wider posteriorly. Mesopleural sutures lying far anteriorly, ending in the outer margin of the lateral plates, which are wide and parallel-sided. 2–3 notopleural setae close together near the open haltere groove. Legs short. Coxa 1 broad, triangular, with a marginal row of moderately long setae. Legs becoming gradually longer posteriorly. Femur and tibia roughly of the same length in each leg. Combined length of femur and tibia 1 : 2 : 3 = 4 : 4.7 : 5. Tibiae nearly parallel-sided, slightly flattened, with 3 rows of short setae in the distal half. Basitarsi very short, about as long as tarsi 2–4 together.

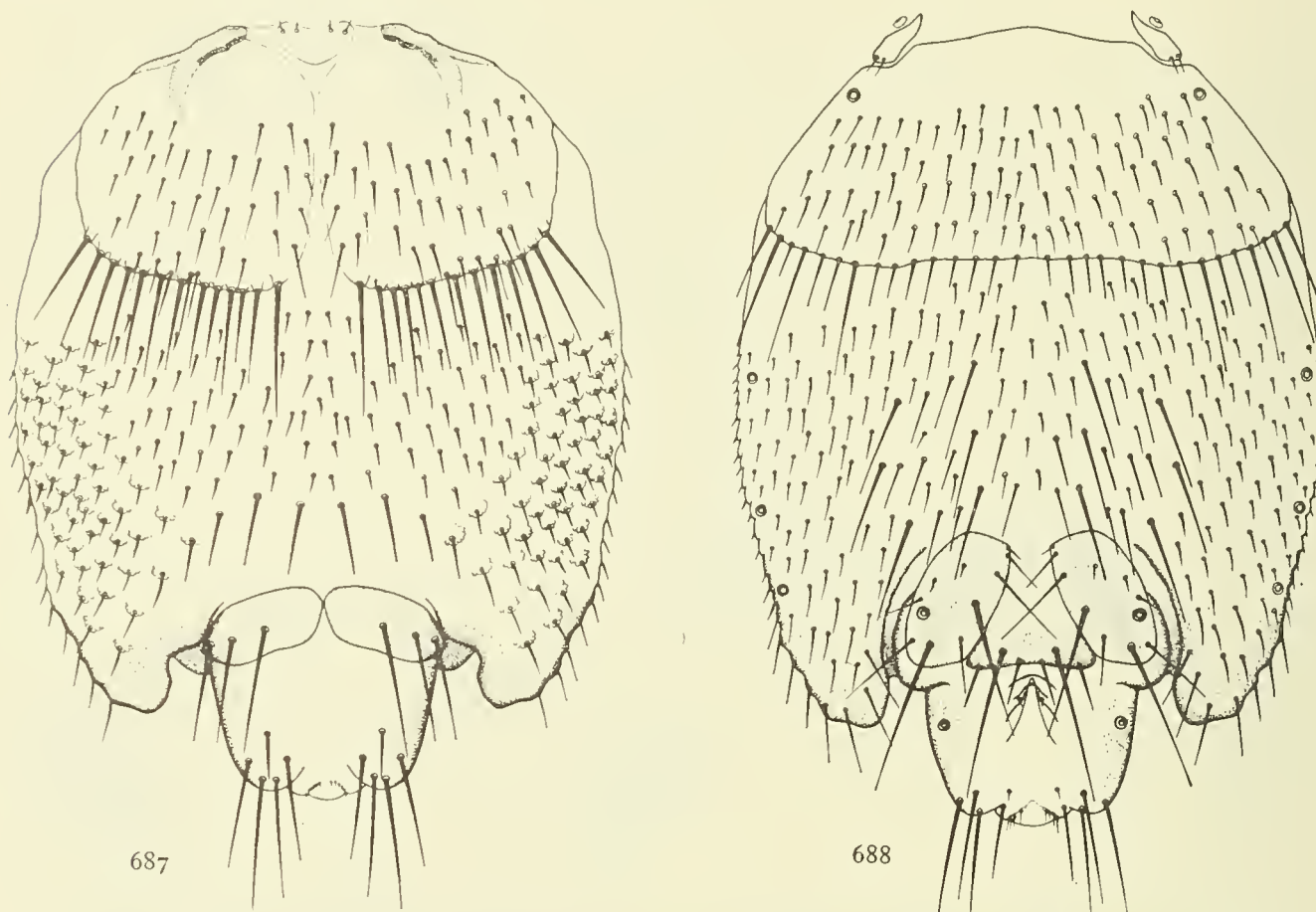
*Male abdomen*. Post-spiracular sclerite broadly triangular, lying close to the spiracle, with 2 setae in the corner farthest from the spiracle. Tergite 1 rudimentary, indicated by 4 short setae. Tergite 2 long, divided in the middle, with a marginal row of moderately long setae and short setae on the posterior part of the surface. Tergites 3–5 short, divided into lateral sclerites. They have marginal rows of short setae which are longer in the middle of tergite 5. Tergite 6 transversely elliptical, undivided, with longer and shorter setae in the marginal row. Surface of tergites 3–6 bare. Anal segment large, conical, flattened dorso-ventrally, with longer and shorter setae in the lateral part of the posterior half. Sternite 1 + 2 short, trapezoidal, with a marginal row of short setae. Ctenidium absent. 3–4 rows of short setae on the surface. Sternites 3 and 4 with similar marginal rows and 2 rows of short setae on the surface of sternite 3 and 1 row on sternite 4. Posterior margin of sternite 4 markedly concave. Sternite 5 longer, with concave posterior margin, a marginal row of longer setae and an irregular row of short setae on the surface. 2 lateral triangular areas which are more heavily sclerotized than the median posterior



Figs. 682-686. *Archinycteribia actena* Speiser. 682. head, lateral; 683. thorax, dorsal; 684. same, ventral; 685. fore-tibia and basitarsus; 686. hind tibia and basitarsus.

area, were interpreted by Speiser as sternite 4. (Sternite 1 + 2 counted as sternite 1.) There is no armature of spines at the posterior margin of sternite 5. Anal segment with a rounded bulge of the anterior margin on the ventral surface.

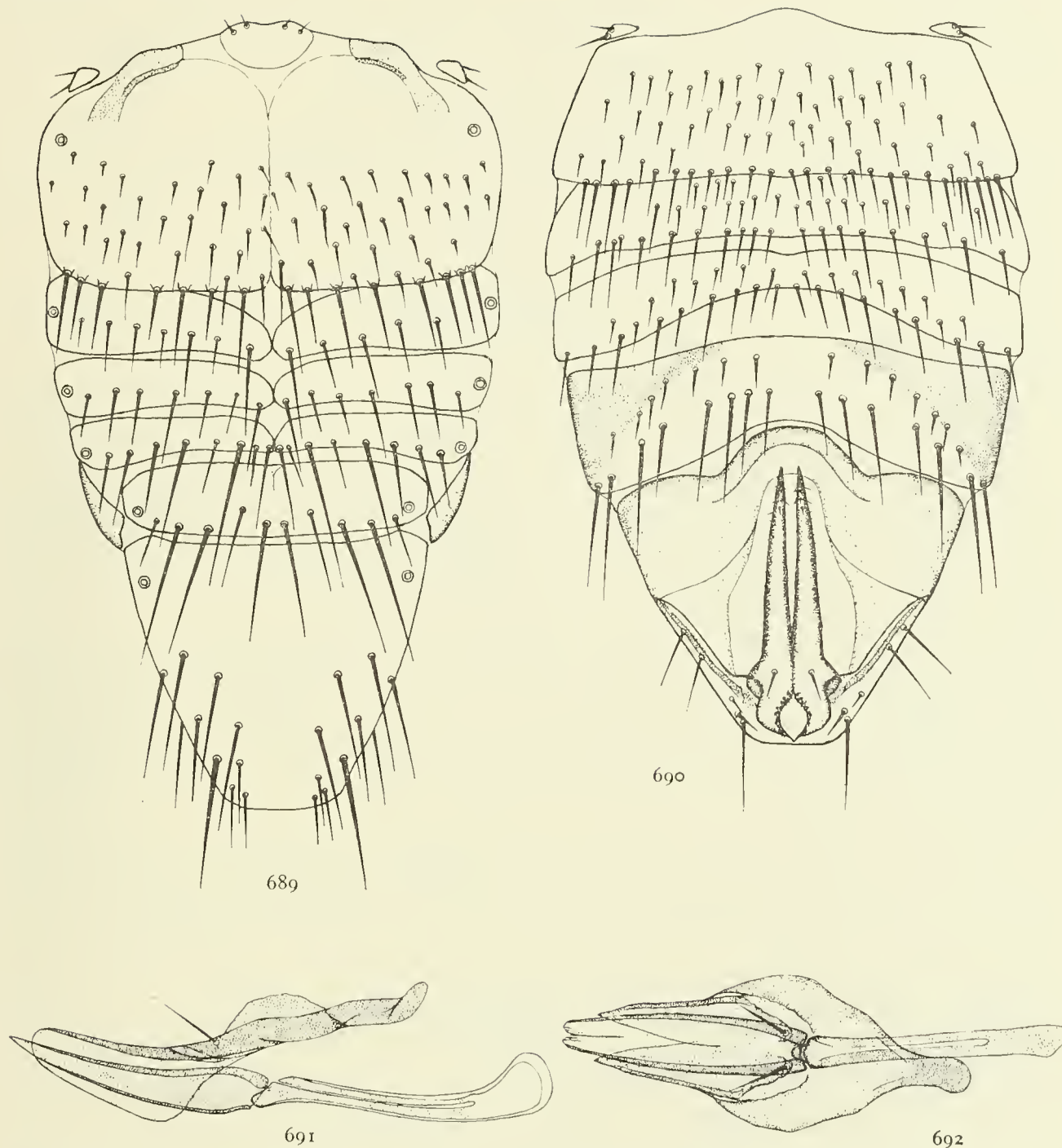
*Genitalia.* Basal arc triangular, with a very long anterior apodeme. Claspers long, straight, tapering to a long point, with a short seta dorsally near the base and minute hairs along the dorsal surface. Aedeagus straight, wide in dorsal view, tapering towards the tip in side view. Apodeme with narrow end-plate. Phallobase flattened, with 2 setae near the base. Parameres absent.



Figs. 687, 688. *Archinycteribia actena* Speiser. Female. 687. abdomen, dorsal; 688. same, ventral.

*Female abdomen.* Tergite 1 rudimentary, as in the male. Tergite 2 longer than in the male, divided into nearly square lateral sclerites, with a marginal row of moderately long setae and short setae on the surface which become longer posteriorly. Dorsum of abdomen membranous behind tergite 2, with 5-7 rows of short setae and a posterior row of longer setae. Tergite 6 divided into small, elliptical lateral sclerites, each bearing 3 setae. The lateral posterior parts of the abdomen are produced into processes lateral to the anal segment. This is wider than long, with a few moderately long setae at the posterior processes and a few premarginal setae, otherwise bare dorsally. Sternite 1 + 2 longer than in the male, trapezoidal, with a marginal row of longer and shorter setae at the sides, and shorter setae in the middle. Surface covered with short setae. Ctenidium absent. Connexivum between sternite 1 + 2 and sternite 6 covered with short setae.





Figs. 689-692. *Archinycteribia actena* Speiser. Male. 689. abdomen, dorsal; 690. same, ventral; 691. genitalia, profile; 692. same, dorsal.

and 3 rows of longer setae indicating the posterior margin of sternites 3, 4 and 5. Sternite 6 consisting of obliquely placed, elliptical lateral sclerites with a premarginal row of long and short setae. Spiracle 6 lies inside these sclerites. Sternite 7 triangular, wedged between the sclerites of sternite 6, with a marginal row of 2 long vertical and several short setae. There are no genital plates, but 2 minute setae are placed near the genital opening and its dorsal edge is strengthened, forming an angle.

4 male syntypes from New Britain, from *Dobsonia peroni* in the Berlin Museum of Natural History, apparently lost.

## MATERIAL IN THE COLLECTION

## SOLOMON ISLANDS

Fatura, Santa Isabel Island, from *Dobsonia inermis*, Mar. 1932, R. A. Lever, 1 ♂ 1 ♀ (Brit. Mus. 1939.338).  
Rennell Island, Lavanggu, 6.xi. 1951, Galathea Expedition, no. L.391, 2 ♂.

**Archinycteribia octophthalma** n.sp.

(Figs. 693-704)

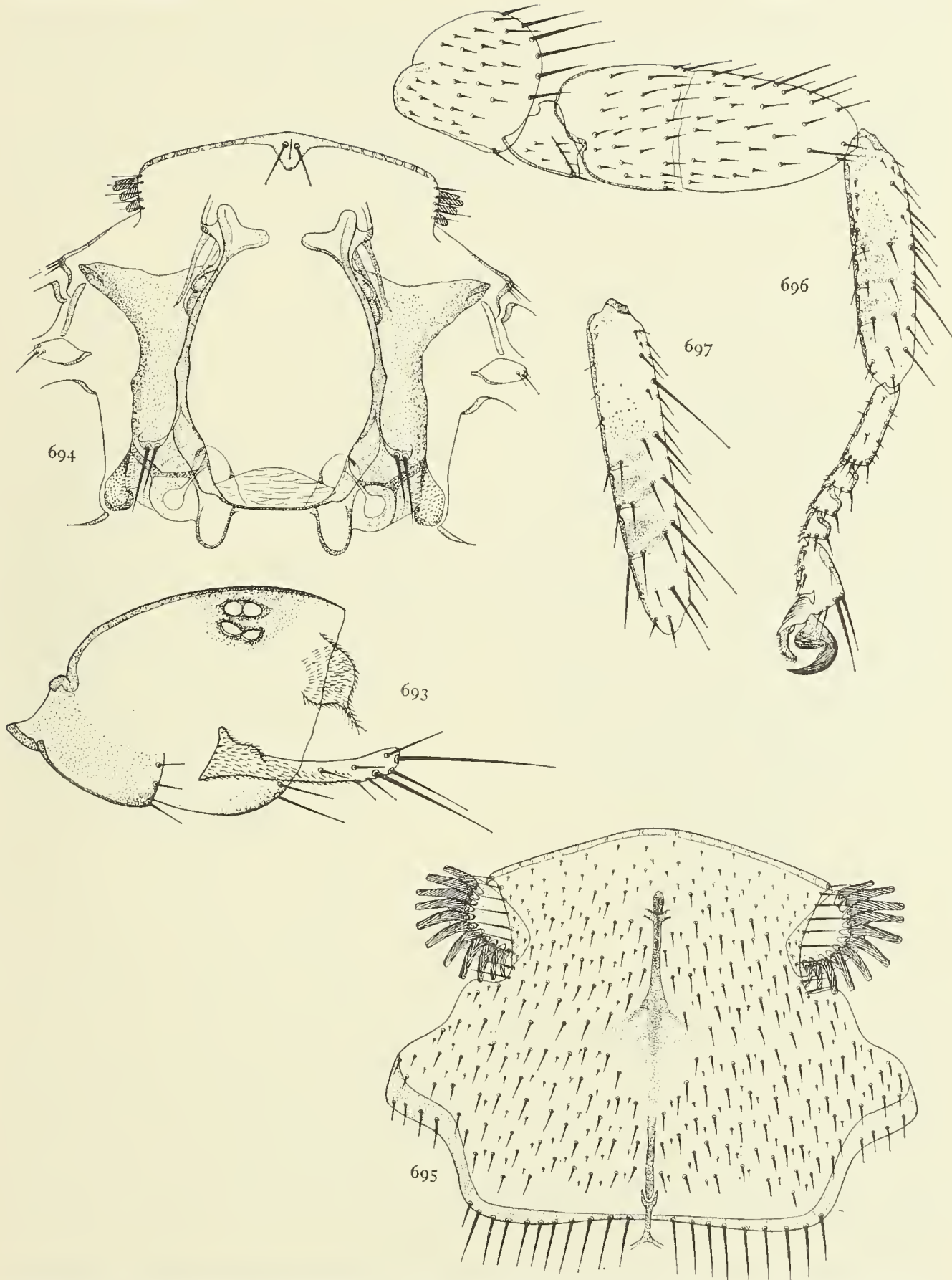
Length 1.75-2 mm. Colour brown.

*Head.* Similar to that of *A. actena*, but instead of eyes with single lenses there are at each side 2 elliptical frames, each divided into 2 lenses. Occasionally only a single lens in a frame. One of the ocular frames is directed dorsally and the other lies inside a lateral concavity, so that the lenses are directed obliquely laterally and ventrally. This is the largest number of lenses found so far in the Nycteribiidae and demonstrates that the number of lenses is variable in the same genus. The area around the eyes is darkly pigmented. There are 3 short setae at the posterior suture of the ventral margin and 2 setae at the anterior ventral angle.

*Thorax.* In general as in *A. actena*, but the mesonotum is more widely elliptical and the notopleural setae shorter. The mesopleural sutures are weakly marked and run along the outer margin of the lateral plates to the haltere groove. The median process of the anterior margin is smaller than in *A. actena*. Coxae 1 rounded posteriorly, with a marginal row of moderately long setae. Thoracic ctenidium with 14 thick, truncate spines with secondary striations. Legs as in *A. actena*, but shorter.

*Male abdomen.* Post-spiracular sclerite broadly triangular, or square, with 3-4 short setae at the corner farthest from the spiracle. Tergite 1 rudimentary, consisting of 2 very small sclerites, each bearing 3 minute hairs. Tergites 2 and 3 divided in the middle. Tergite 3 about half the length of tergite 2. Tergites 4-6 very short, undivided, strip-like. Tergite 4 divided in some specimens. Tergite 6 about half as wide as tergite 4. Tergites 2-6 with marginal rows of short setae, and tergites 2-4 with short setae on the surface. Only a few hairs on the surface of tergite 5, and tergite 6 bare. Anal segment short, conical, with 2-3 setae at the posterior lateral corners and 4 setae on the surface. Sternite 1 + 2 with straight posterior margin which bears a marginal row of setae which are longer laterally. Ctenidium absent. Sternite 3 shorter, with a similar marginal row and 3-4 rows of short setae on the surface. Sternites 4 and 5 short, strip-like, curved, concave posteriorly, with similar marginal rows and 1-2 rows of short setae on the surface. The form of sternite 5 in this species confirms the interpretation that this sternite is also undivided in *A. actena*. Anal segment with sclerotized anterior margin of the ventral surface.

*Genitalia.* Claspers very short, about half the length of those of *A. actena*, tapering to a blunt point with a short ventral hook. A moderately long seta dorsally near the base and a row of short setae on the dorsal surface. Basal arc triangular, with an apodeme which is as long as that of the aedeagus. Aedeagus short, laterally sclerotized in 2 ridges, tapering to a blunt point,

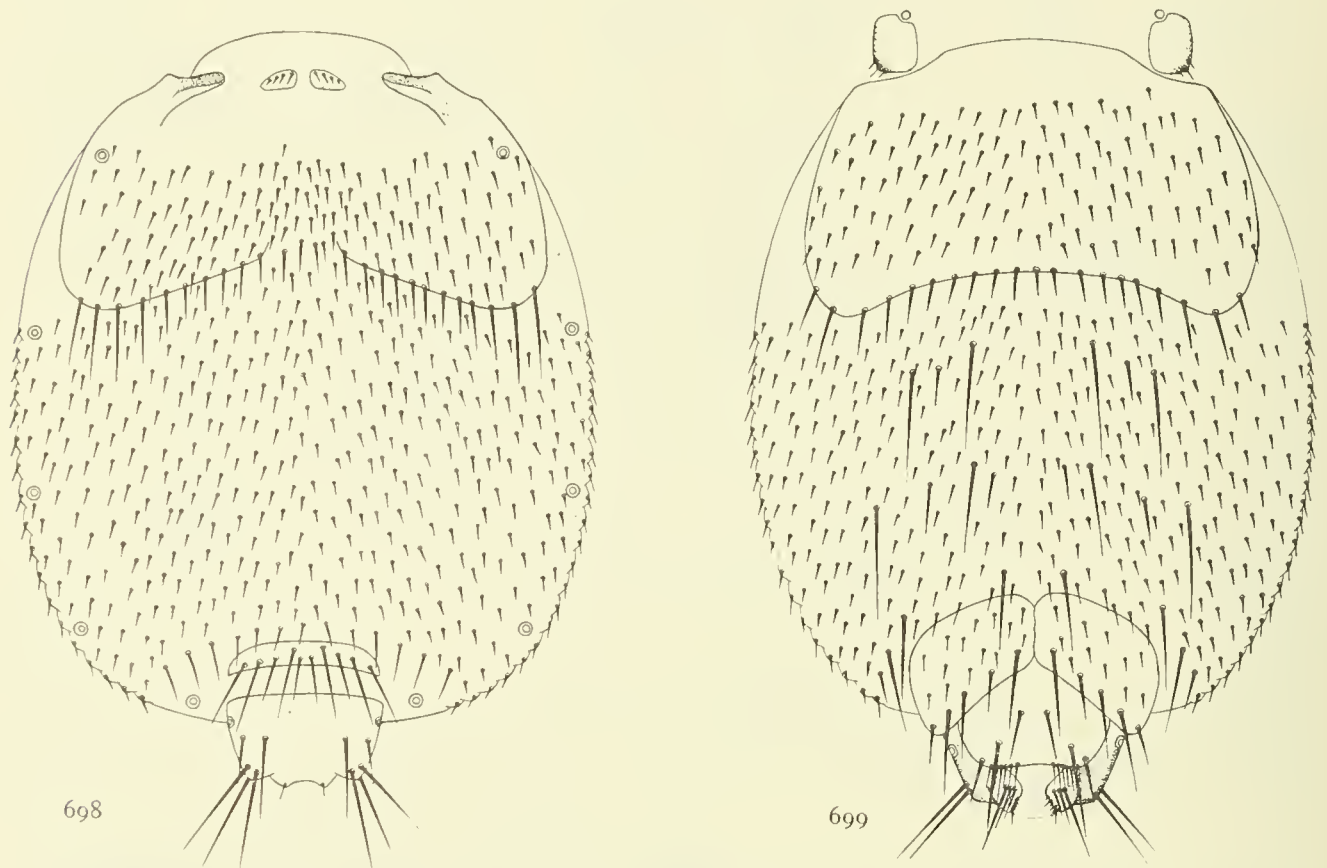


Figs. 693–697. *Archinycteribia octophthalma* n. sp. 693. head, lateral; 694. thorax, dorsal; 695. same, ventral; 696. fore-leg; 697. hind tibia.



widest in the middle in sideview. The lateral ridges of the aedeagus can be turned sideways, as in *C. ferrarii* and the endophallus is extended during copulation. Apodeme short and narrow. Parameres short, triangular, with short, pigmented apical ends. Phallobase short, conical, with 2 short setae in the middle on each side.

*Female abdomen.* Tergite 1 as in the male. Tergite 2 indistinctly divided in the middle, with concave posterior margin and a marginal row of shorter setae in the middle and longer setae laterally. 5-6 rows of short setae on the surface. Connexivum behind tergite 2 with about



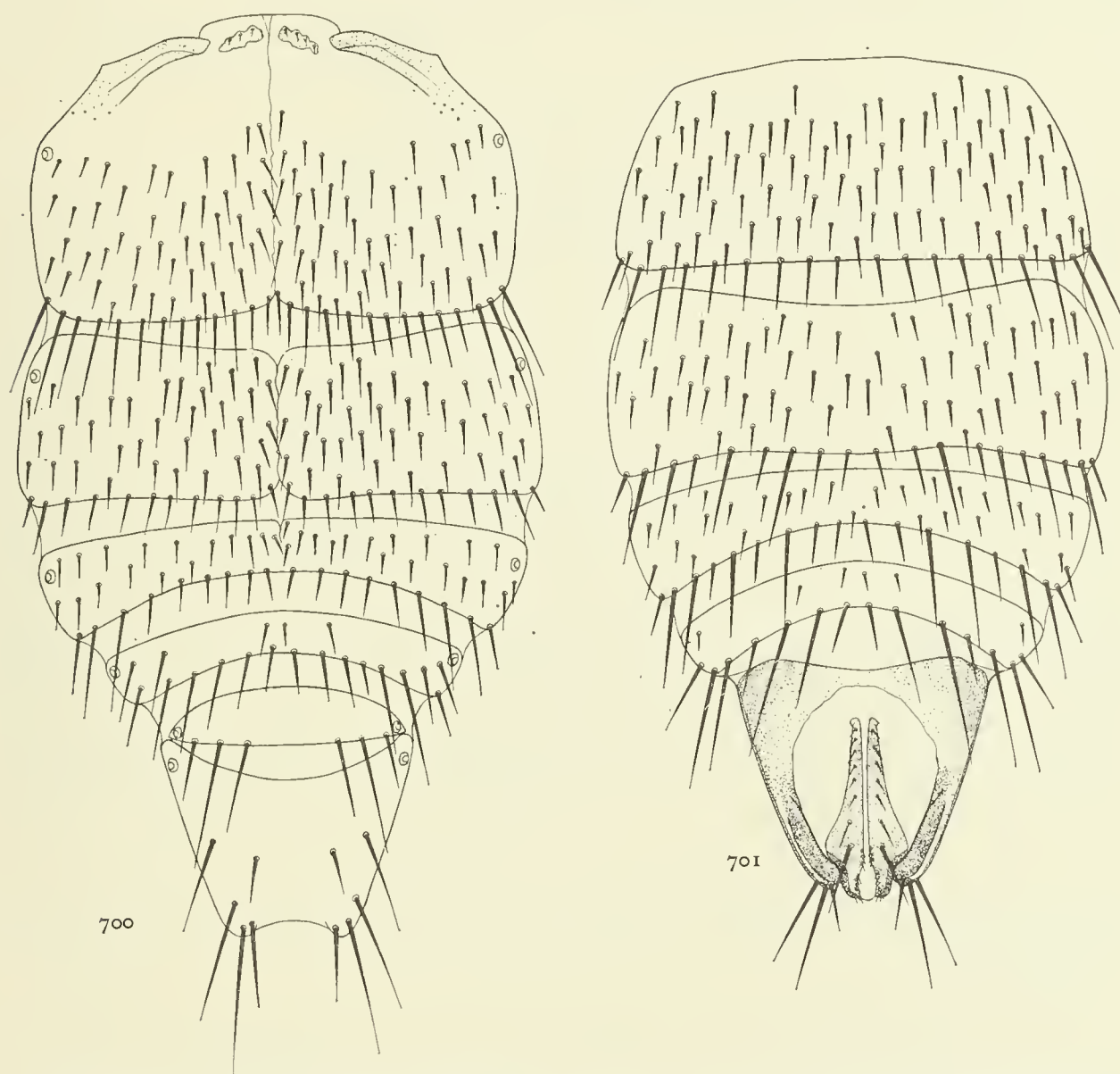
Figs. 698, 699. *Archinycteribia octophthalma* n. sp. Female. 698. abdomen, dorsal; 699. same, ventral.

15 rows of short setae, those of the posterior row longer. Tergite 6 very short, slightly curved, with a row of moderately long setae. Anal segment short, truncate, with a few setae at the posterior corners and 4 setae on the dorsal surface. Sternite 1 + 2 longer than in the male, with concave posterior margin and a marginal row of shorter setae in the middle and slightly longer setae laterally. Short setae on the surface. Sternites 3-5 membranous, covered with short setae and with 4 long setae near the margin. The limits of the sternites are recognizable in distended specimens by narrow bare strips in the spinose field. Sternite 6 with 2 elliptical or rhomboidal, obliquely placed, lateral sclerites which touch in the middle. They have a marginal row of longer and shorter setae, and shorter setae on the surface. Sternite 7 undivided, triangular, wedged between the sclerites of sternite 6. It has a marginal row of short, thin setae, with a gap in the middle and 2 oblique rows of 3 longer setae on the surface, forming an angle with the

apex anteriorly. Genital plates absent. 3 setae near the inner ventral endings of the anal frame at each side.

Distribution: Malaya, Borneo.

MALAYA. Selangor, Bukit Lagong Forest Reserve, from *Penthetor lucasi*, 3.i. 1950, ♂ holotype and 15 paratypes of both sexes. RTB-9303-9305; RTB-9345-9350. British Scrub Typhus Unit. Chicago Natural History Museum.



Figs. 700, 701. *Archinycteribia octophthalma* n. sp. Male. 700. abdomen, dorsal; 701. same, ventral.

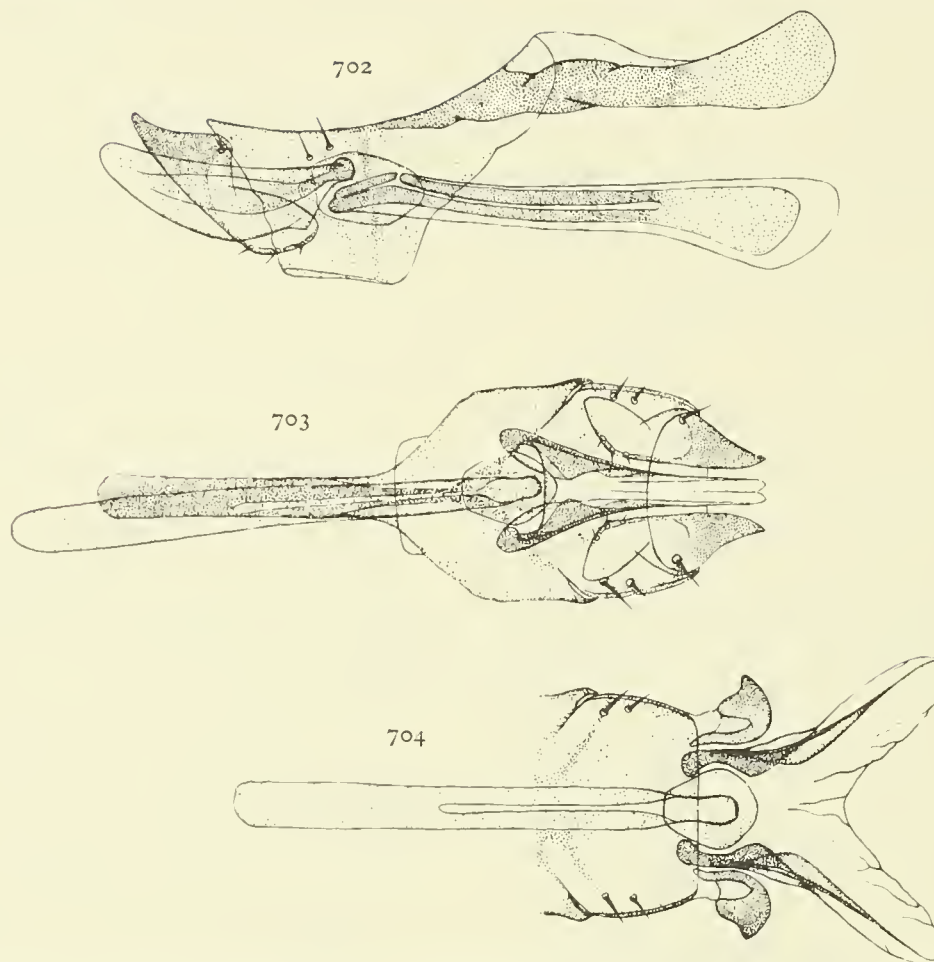
Same data, 16.ix. 1953, B-30077. 10 specimens, paratypes. U.S. National Museum.

Same data, from *Myotis mystacinus muricola*, 10.iii. 1950, 1 ♀, RTB-9398.

Same data, from *Hipposideros* sp., 1 ♂ 1 ♀, RTB-9396-9397. Chicago Natural History Museum.

BORNEO. Sarawak, from *Penthetor lucasi*, 1920, 1 ♂ 3 ♀.

Batu Maliau, Long Lobang, from bats, 16 ♂ ♀, RTB-7823, 7824.



Figs. 702-704. *Archinycteribia octophthalma* n. sp. Male genitalia. 702. profile; 703. same, dorsal, resting position; 704. same, extended.

Tinjar Caves, from bats, 26.vi. 1950, Harrison, Insoll, Johan, 20 ♂ ♀, RTB-7825, 7826.

Beaufort, from *Rattus sabanus*, 14.v. 1952, British Scrub Typhus Unit, 2 ♂, RTB-10409.

#### MATERIAL IN THE COLLECTION

##### MALAYA

Singapore, from *Penthetor lucasi*, 1913, H. W. Ridley, N. C. Rothschild, 1 ♀ paratype (Brit. Mus. 1913.450).

Selangor, Bukit Lagong Forest Reserve, from *Penthetor lucasi*, 23.i. 1950, 2 ♂ 2 ♀ paratypes. British Scrub Typhus Unit.

#### HOST SYNONYMY

Name on original label  
*Cynopterus lucasi* Dobson.  
*Myotis muricola* Gray.

Current name  
*Penthetor lucasi* Dobson.  
*M. mystacinus muricola* Gray.

#### GENUS EUCAMPSIPODA Kolenati, 1857

*Eucampsipoda*. Kolenati, 1857, *Wien. Ent. Monatsschr.* 1, 62. Type species: *Nycteribia hyrtlui* Kolenati, 1856.

Head laterally compressed, pigmented dorsally, with elliptical single lenses. Palps finger-shaped. Labella of the proboscis longer than the theca. Thorax pentagonal. Thoracic ctenidia consisting of thick, blunt spines. Mesonotum narrow, widening posteriorly. One long and one



short notopleural seta. Haltere groove without cover. Oblique sutures open, well marked. Tibiae long, cylindrical, parallel-sided, with 2 rings of weaker integument and short setae in the middle. Tergites 1 and 2 of the abdomen fused in both sexes. Abdominal ctenidium consisting of long, thick, blunt spines. Post-spiracular sclerite with a single seta. Segmentation of the abdomen of the female reduced, normal in the male. Ventral genital plate (sternite 7) of the female divided into 2 sclerites which bear spines. Aedeagus of the male tubular, with a large endophallus, connected with the phallobase by a membrane bearing numerous spines. Claspers straight, thin, covered with spines and setae.

KEY TO THE SPECIES OF *EUCAMPSIPODA*

## MALES

The key is based mainly on the structure and the chaetotaxy of the claspers which are visible in alcohol material. The peg-like spines on the claspers should be examined under a high magnification and best in balsam preparations. A peg is a barrel-shaped, short spine, generally thicker in the middle than at the base and as a rule not more than 2 or 3 times as long as thick, with a rounded or blunt tip. There are transitions from spines to pegs and there are sometimes pegs in one specimen and spines in another in the same position. Pegs and spines are often seen shortened and it is sometimes difficult to distinguish between a small peg and a spine. The aedeagus has to be dissected out after treatment in KOH and mounted in side view. A preparation of the whole phallobase with the aedeagus *in situ* is equally good. Dissection of the genitalia is a delicate operation and not always successful and the present key is therefore not as easily applicable as would be desirable, but no external characters were found which gave easier or safer means of identification. Some chaetotactic differences are mentioned in the descriptions and some are used in the key, but most of them are so small or variable that they are often only apparent if sufficient material of several species is available for comparison. The length of clasper and aedeagus varies to a certain extent within the species and the figures given are the average of measurements of a number of specimens.

1. A group of short spines at the apex of sternite 5. 2  
Only thin hairs at the apex of sternite 5. 3
2. A row of 6–8 strong, short spines at the apex of sternite 5 (Figs. 742–746). 2  
***E. philippinensis*** (p. 426)  
Only 2 larger and 1 or 2 much smaller such spines at the apex of sternite 5.\* Middle East (Figs. 710, 716).\* 3  
***E. hyrtlil*** (p. 413)
3. Claspers narrow and tapering to a point. Peg-like spines on the dorsal surface. 4  
Claspers broad throughout or in basal half. Only ordinary spines on the dorsal surface. 8
4. Pegs very small, arranged in a single irregular dorsal row of 7–9 pegs. Aedeagus very long (0.52 mm.) and narrow, 13 times as long as wide at the base. Madagascar (Figs. 734, 735). 4  
***E. madagascarensis*** (p. 423)  
Pegs large, arranged in 2 rows, aedeagus shorter. 5
5. Claspers 0.38 mm. long. No long seta dorsally near the base, but 2–3 short setae. Pegs arranged in 2 rows from the tip to before the middle of the clasper. Pegs of the outer row large, those of the inner row smaller near the tip. A row of hairs begins near the 4th lateral peg and the hairs

\* In some specimens of *E. hyrtlil* these spines are very small or absent and the species therefore appears in the key twice.

## CYCLOPODIINAE

## EUCAMPSIPODA

become longer basally. Aedeagus 0.35 mm. long, 8 times as long as wide at the base. Abdominal ctenidium with 36 teeth. Oriental (Figs. 723-725). **E. inermis** (p. 418)

A long seta on the dorsal surface of the clasper near the base. **6**

6. Claspers short (0.3 mm.). Pegs large, arranged in 2 equal rows from the apical to the basal third of the clasper. Hairs longest near the tip, before the pegs. Aedeagus short (0.23 mm.), 5 times as long as wide at the base and markedly wider apically. Abdominal ctenidium with 28-30 teeth. Oriental (Figs. 750-752). **E. sundaica** (p. 426)

Claspers longer (0.43-0.48 mm.), aedeagus longer and narrower. Pegs and hairs on clasper arranged differently. **7**

7. Pegs large, arranged in 2 rows from near the tip to about the middle of the clasper. Pegs of both rows of equal size. Parameres small, triangular with a minute hair. Aedeagus long (0.48 mm.), 8 times as long as wide at the base. Middle East (Figs. 710-716). **E. hyrtlui** (p. 413)

Lateral dorsal row consisting of 5-8 large pegs, beginning near the tip. Inner dorsal row consisting of 7-8 pegs which are very small or spine-like near the tip and larger basally. Parameres large with 3-4 small hairs. Aedeagus shorter (0.38 mm.), about 7 times as long as wide at the base. Ethiopian (Figs. 717-720). **E. africana** (p. 417)

8. Claspers short (0.3 mm.) and broad, tapering only slightly towards a blunt tip. A row of about 7 strong spines which become longer basally at the lateral edge, beginning at the tip. An inner dorsal row of 5-6 small spines near the tip. A row of hairs laterally, the longest near the middle of the clasper. Aedeagus 0.35 mm. long, 6-7 times as long as wide at the base. Oriental (Figs. 728-730). **E. latisterna** (p. 420)

Claspers 0.35 mm. long, wide in the basal half, tapering towards the middle and very narrow in the apical half. Only one dorsal row of 6-7 very small spines and a row of hairs laterally. Aedeagus short (0.3 mm.) and very narrow, 9-10 times as long as wide. Sternite 5 only slightly convex posteriorly. Oriental (Figs. 737, 738). **E. penthetoris** (p. 423)

## FEMALES

The characters used are mainly the arrangement of the long setae on the dorsum of the abdomen, the anal sclerite and the genital plates. These are not visible in alcohol material except the ventral plates and the anal sclerite in those species in which the dorsal lip is reduced to lateral flaps, and mounting in balsam is therefore necessary in general.

1. Only 2 long setae near the posterior margin of the spinose area of the dorsum of the abdomen (rarely 3 or 4). 6-8 long setae at the hind margin of tergite 6. Ethiopian (Figs. 721, 722). **E. africana** (p. 417)

Long setae on dorsum of abdomen more numerous. **2**

2. Long setae on dorsum arranged in 2 groups, one of shorter setae close to tergite 1 + 2 and a group of longer and stronger setae farther posteriorly. **3**

Only one group of long setae present. **5**

3. Anterior group consisting of 8-10 fine setae, arranged in 2 transverse rows. They are not longer than the marginal setae of tergite 1 + 2. Posterior group consisting of 2 groups of 3-5 long setae in the middle of the dorsum. Tergite 6 short with 10-14 long setae posteriorly. Dorsal genital plate very broad, nearly square. Ventral plates broad, triangular with a row of spines at the dorsal edge which are short pegs near the middle and longer laterally. The 2 rows form an obtuse angle. Anal sclerite absent. Oriental (Figs. 731-733).

**E. latisterna** (p. 420)

Setae of the anterior group longer and more numerous. Anal sclerite present. **4**

4. Anterior group divided into halves of about 12 setae each. Posterior group also divided into halves of 5-7 very long setae in the middle of the dorsum. Tergite 6 elliptical with a row of 8-10 long setae posteriorly with a gap in the middle. Dorsal genital plate longer than broad. Ventral



plates narrow, triangular with a row of 5–6 pegs. Anal sclerite short, broader posteriorly, with 2 long setae and several small spines on the surface. Anal segment very short. Middle East. (Figs. 705–709).

**E. hyrtlíi** (p. 413)

Arrangement of long setae similar, but both groups not divided into halves and there are 1 or 2 pairs of long setae between the anterior and the posterior group. Tergite 6 with only 6–8 setae posteriorly. Dorsal genital plate as wide as long. Ventral plates broad, with a row of 6–7 spines (not pegs). Anal sclerite long and narrow. Anal segment rounded (Fig. 736).

**E. madagascarensis** (p. 423)

5. The group of long setae consists of 8–10 setae in 2–3 transverse rows close together in the middle of the dorsum. Tergite 6 large, roughly rectangular with 2 groups of 3 setae at the sides of the hind margin. Dorsal genital plate much wider than long. Ventral plates narrow, curved, with a row of about 7 long spines which are shorter towards the middle. Ventral plates not covered by the dorsal lip which is reduced to lateral flaps. Anal sclerite short, isolated, with only 2 long setae. Oriental (Figs. 739–741).

**E. penthetoris** (p. 423)

The group of long setae stretches from near tergite 1 + 2 to the posterior margin, or nearly so, of the spinose area of the dorsum and consists of 10–16 setae.

6

6. Tergite 6 short, with a row of 12–14 long setae posteriorly. Abdominal ctenidium with 36 spines. Dorsal genital plate very narrow, twice or 3 times as long as wide. Ventral plates triangular, with only 1–3 very small ordinary spines at the inner dorsal corners. A dorsal and a ventral lip present. Anal sclerite small, drop-shaped, isolated, with only 2 long setae. Oriental (Figs. 726, 727).

**E. inermis** (p. 418)

Tergite 6 with a row of only 6–8 long setae posteriorly. Abdominal ctenidium with 28–33 spines.

7

7. Setae in the middle of the hind margin of tergite 1 + 2 long. Spiracles of segment 6 lie outside the tergite. The group of 10–16 very long setae begins close to tergite 1 + 2 and broadens posteriorly. Dorsal genital plate broadly rounded, as wide as long. Ventral plates triangular, with 2–3 thick pegs at the inner dorsal corner and a second row of small spines. Anal sclerite square, with 2–3 long setae at the end and several pegs or spines on the surface. Dorsal lip divided into lateral flaps which do not cover the ventral plates. Anal segment short with one group of setae near the anus. Oriental (Figs. 753–755).

**E. sundaica** (p. 426)

Setae in the middle of the hind margin of tergite 1 + 2 short. Spiracles of segment 6 lie inside the tergite. The group of 8–12 moderately long setae begins at a distance from tergite 1 + 2, does not broaden posteriorly and ends usually before the hind margin of the spinose area. Anal segment rather long, with 2 rows of long setae, hollowed out ventrally. Dorsal genital plate rounded, small, fused with the long and narrow anal sclerite into a spoon-shaped structure. Dorsal lip absent. Ventral plates triangular, with a row of setae which are shorter in the middle (Figs. 747–749).

**E. philippinensis** (p. 426)

### **Eucampsipoda hyrtlíi** (Kolenati, 1856)

(Figs. 20, 27, 33, 41–43, 52, 56, 705–716)

*Nycteribia hyrtlíi*. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

? *Nycteribia fitzingerii*. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Eucampsipoda hyrtlíi*. Kolenati, 1857, *Wien. Ent. Monatsschr.* **1**, 61.

*Eucampsipodia hyrtlíi*. (Kolenati). Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

? *Nycteribia aegyptia*. Macquart, 1851, *Mem. Soc. Sci. Lille*, p. 282.

*Eucampsipoda hyrtlíi* (Kolenati). Speiser, 1901, *Arch. Naturgesch.* **67**, 11 (*pro parte*, records from Egypt only).

nec *Eucampsipoda hyrtlíi* (Kolenati). Speiser, 1908, Voeltzkow, *Reise in Ostafrika*, **2**, 202 (refers to *E. madagascarensis*).

nec *Eucampsipoda hyrtlíi* (Kolenati). Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209 (refers to *E. latisterna*).

nec *Eucampsipoda hyrtlíi* (Kolenati). Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (refers to *E. latisterna* (Ceylon record) or other Oriental species).

nec *Eucampsipoda hyrtlíi* (Kolenati). Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 548 (refers to *E. africana*).

nec *Eucampsipoda hyrtlíi* (Kolenati). Falcoz, 1924, *Bull. Mus. Hist. Natur. Paris*, **30**, 223 (refers to *E. africana*).

nec *Eucampsipoda hyrtlíi* (Kolenati). Ferris, 1924, *Phil. Jour. Science*, **24**, 73 (refers to *E. latisterna*).



nec *Eucampsipoda hyrtlui* (Kolenati). Patton, 1924, *Jour. Fed. Malay States Mus.* **14**, 376 (refers to either *E. latisterna*, *E. inermis*, or *E. sundaica*).

nec *Eucampsipoda hyrtlui* (Kolenati). Thompson, 1937, *Jour. Animal Ecol.* **6**, 337 (refers to *E. latisterna*).

*Eucampsipoda hyrtlui* (Kolenati). Theodor & Moscona, 1954, *Parasitology*, **44**, 157.

*Eucampsipoda hyrtlui* (Kolenati). Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 40.

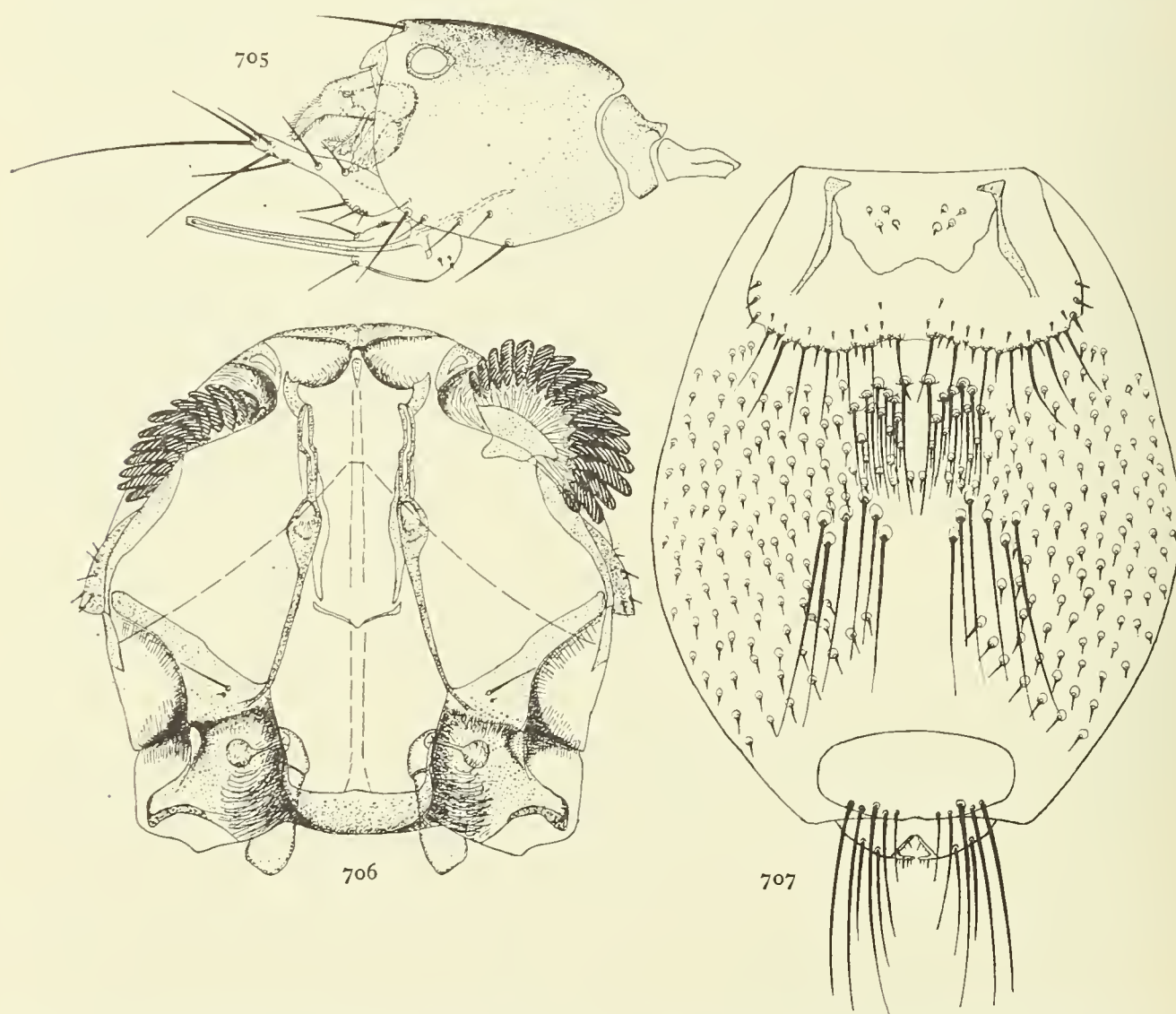
*Eucampsipoda hyrtlui* (Kolenati). Theodor, 1955, *Parasitology*, **45**, 195.

*Eucampsipoda hyrtlui* (Kolenati). Theodor, 1957, *Parasitology*, **47**, 157.

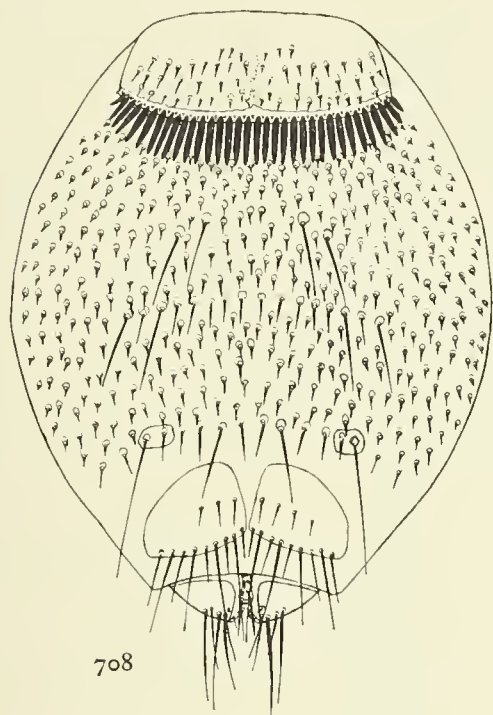
Head and thorax as for the genus. Labella of the proboscis twice as long as the theca.

*Male abdomen.* Tergites 3–6 short, with marginal rows of moderately long setae. 2–4 long setae in the middle of the marginal rows of tergites 4–6. Sternite 5 triangularly produced in the middle of the posterior margin, with 2 short and 2 very short spines at the apex. These spines are absent in some specimens.

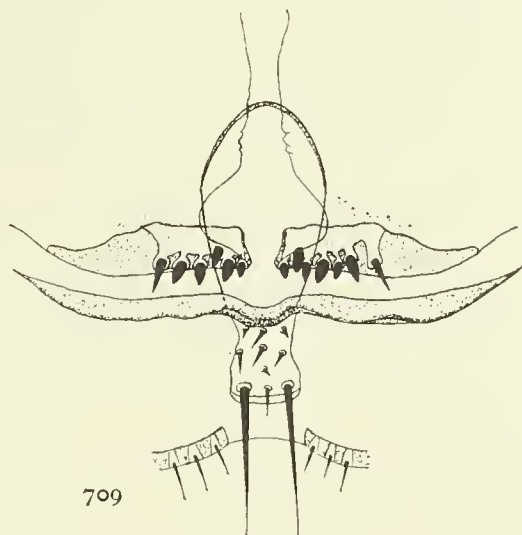
*Genitalia.* Claspers long, 0.43 mm., straight, pointed in dorsal view. In side view, the tip of the claspers is widened and has a short tooth ventrally, close to the tip. There are 2 rows of 6–8 short, thick peg-like spines on the dorsal surface from near the tip to about the middle of the clasper. The lateral row begins nearer the tip and the dorsal row reaches further basally.



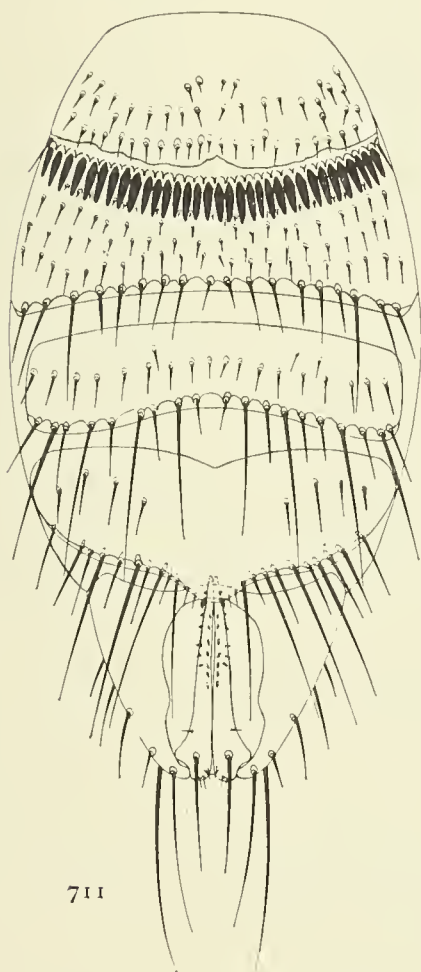
Figs. 705–707. *Eucampsipoda hyrtlui* (Kolenati). 705. head, profile; 706. thorax, dorsal; 707. female abdomen, dorsal.



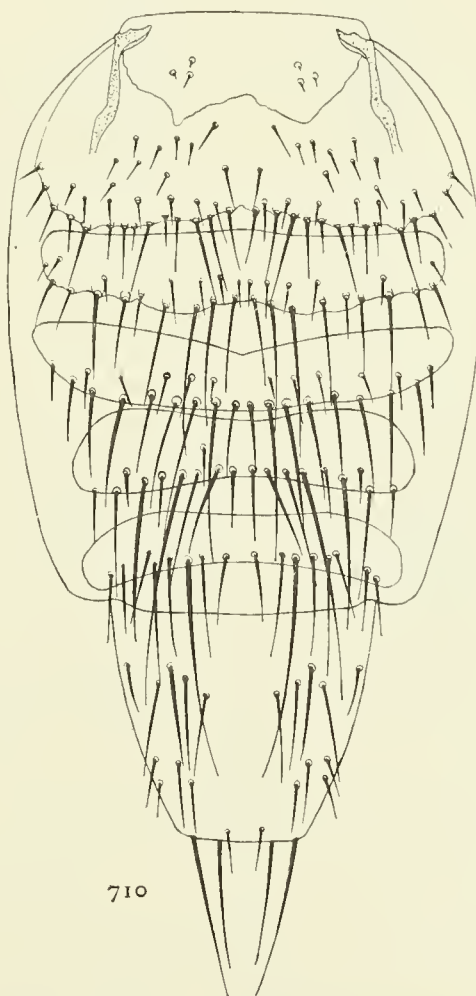
708



709



711

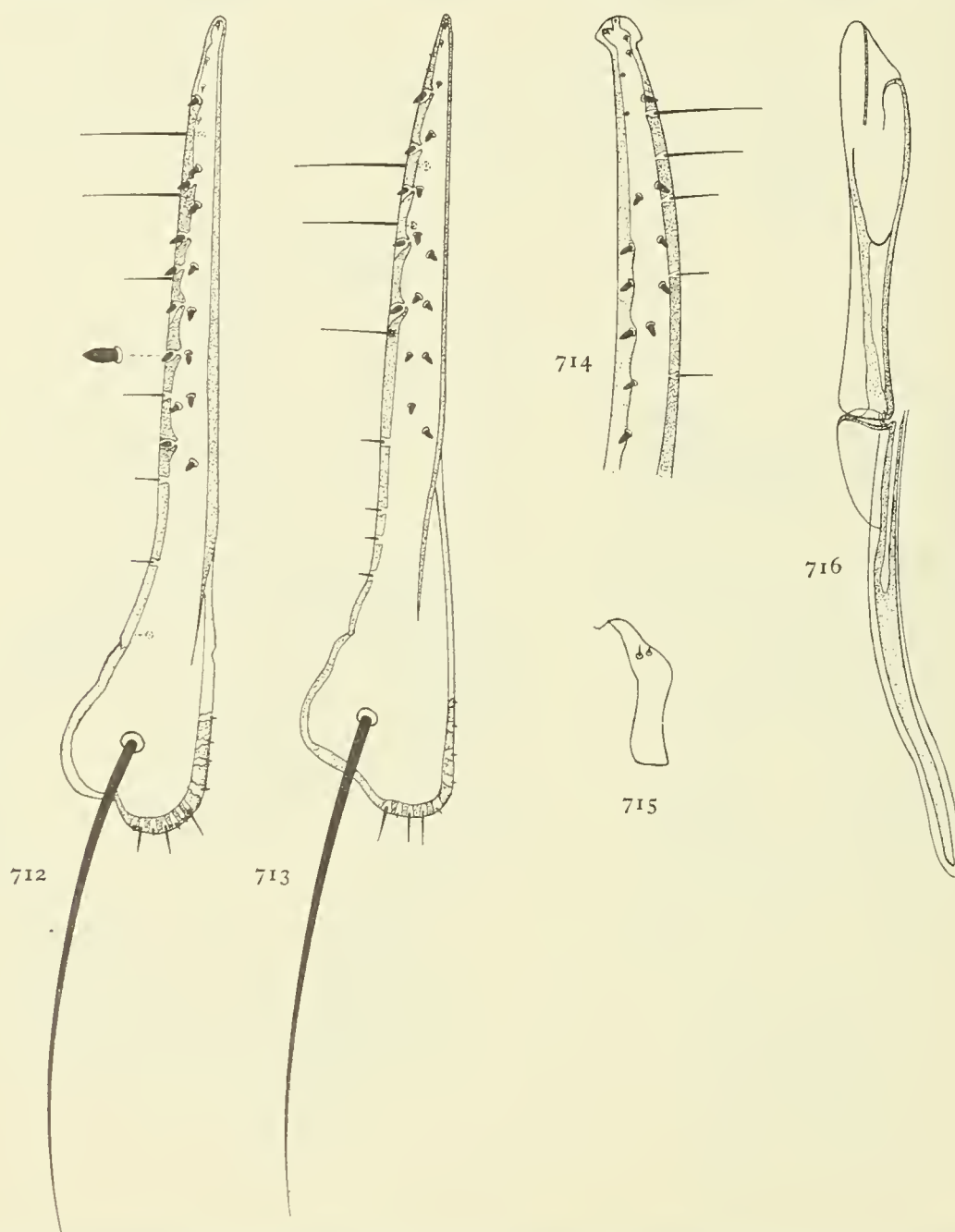


710

Figs. 708-711. *Eucampsipoda hyrtlui* (Kolenati). 708. female abdomen, ventral; 709. genital plates; 710. male abdomen, dorsal; 711. same, ventral.

A row of thin setae laterally near the tip. A long seta dorsally near the base. Basal arc triangular, with a long anterior process. Aedeagus cylindrical with oblique anterior opening, 0.43 mm. long, 8 times as long as wide at the base.

*Female abdomen.* Tergite 1 + 2 with a marginal row of moderately long and short setae and 1 or 2 rows of short premarginal setae on the surface. 2 groups of long setae on the connexivum behind tergite 1 + 2, an anterior group with about 10 thin setae in each half and a posterior group of 5-7 longer setae in each half in the middle of the dorsum. The area between and behind the long setae is bare. Tergite 6 short, transversely elliptical, with 8-10 long setae at the posterior margin. Sternite 1 + 2 short, with a ctenidium of 32-36 thick spines. Sternites 3-5 membra-



Figs. 712-716. *Eucampsipoda hyrtlí* (Kolenati). Male. 712. clasper; 713. same, with an extra row of pegs; 714. tip of clasper, profile; 715. paramere; 716. aedeagus and apodeme.



nous, covered with short spines, their posterior margin indicated by longer setae. Sternite 6 with lateral triangular sclerites with a marginal row of long and short setae. Sternite 7 (genital plates) divided into wing-shaped halves with about 6 short pegs in each half. Dorsal plate longer than wide, rounded anteriorly, fused with the anal sclerite which is broad and has 2 setae posteriorly and a few small spines on the surface.

Distribution and hosts: Middle East, from Syria to Arabia, possibly East Africa, from *Rousettus aegyptiacus*, *Eidolon sabaeum*.

## MATERIAL IN THE COLLECTION

EGYPT	Nazareth, from <i>Rousettus aegyptiacus</i> , May 1921, P. A. Buxton, 1 ♀.
Cairo, July 1901, N. C. Rothschild, 1 ♂ 2 ♀.	Herzliya, from <i>Rousettus aegyptiacus</i> , 15.xii. 1946, O. Theodor, 2 ♂ 4 ♀ (Brit. Mus. 1947.277).
Cairo, from <i>Rousettus aegyptiacus</i> , N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).	
ISRAEL	ARABIA
Jaffa, from <i>Rousettus aegyptiacus</i> , 7.i.1912, J. Aharoni, N. C. Rothschild, 2 ♂.	Lahej, from <i>Eidolon sabaeum</i> , 29.iii. 1895, Yerbury, 3 ♂ 1 ♀.

## HOST SYNONYMY

Name on original label	Current name
<i>Xantharpyia straminea</i> Geoffroy.	<i>Eidolon sabaeum</i> Andersen.

**Eucampsipoda africana** Theodor, 1955

(Figs. 717–722)

*Eucampsipoda africanum*. Theodor, 1955, *Parasitology*, **45**, 195.

*Eucampsipoda africanum*. Theodor, 1957, *Parasitology*, **47**, 457.

*Eucampsipoda hyrtlui* (Kolenati). Falcoz, 1923, *Arch. Zool. exp. gen.* **61**, 548.

*Eucampsipoda hyrtlui* (Kolenati). Falcoz, 1924, *Bull. Mus. Hist. Natur. Paris*, **30**, 223.

Length, head and thorax as in *E. hyrtlui*.

Male abdomen also as in *E. hyrtlui*, but there are no spines at the median process of the posterior margin of sternite 5, only thin setae.

*Genitalia*. Claspers with a row of 5–7 pegs at the outer edge of the dorsal surface from near the tip to about the middle of the clasper and a row of much smaller spines on the dorsal surface, which are ordinary spines anteriorly and pegs posteriorly; a long seta dorsally near the base. Aedeagus shorter and wider than in *E. hyrtlui*, 0.38 mm. long, 7 times as long as wide.

*Female abdomen*. Only 2 long setae (rarely 3 or 4) near the posterior margin of the spinose area of the dorsum. Tergite 6 more broadly elliptical than in *E. hyrtlui*, with a row of 5–8 long setae at the posterior margin. Ventral plates of sternite 7 broadly triangular, with 5–7 pegs at the inner dorsal corner. Dorsal plate broadly rounded, anal sclerite narrow, with 2 setae posteriorly.

Distribution and hosts: Ethiopian Africa, mainly on *Rousettus aegyptiacus leachi*, but also on *Rousettus aegyptiacus aegyptiacus*, *Eidolon helvum*.

## MATERIAL IN THE COLLECTION

SIERRA LEONE	KENYA
Musaia, from <i>Rousettus aegyptiacus</i> , F. R. Allison, 24.viii. 1960, 5 ♀ and puparia; 26.viii. 1960, 3 ♂; 23.ix. 1960, 1 ♂ 3 ♀.	Bahati caves, from <i>Rousettus aegyptiacus leachi</i> , Aug. 1950, P. C. C. Garnham, ♀ holotype, 3 ♂ 4 ♀ paratypes.

## CYCLOPODIINAE

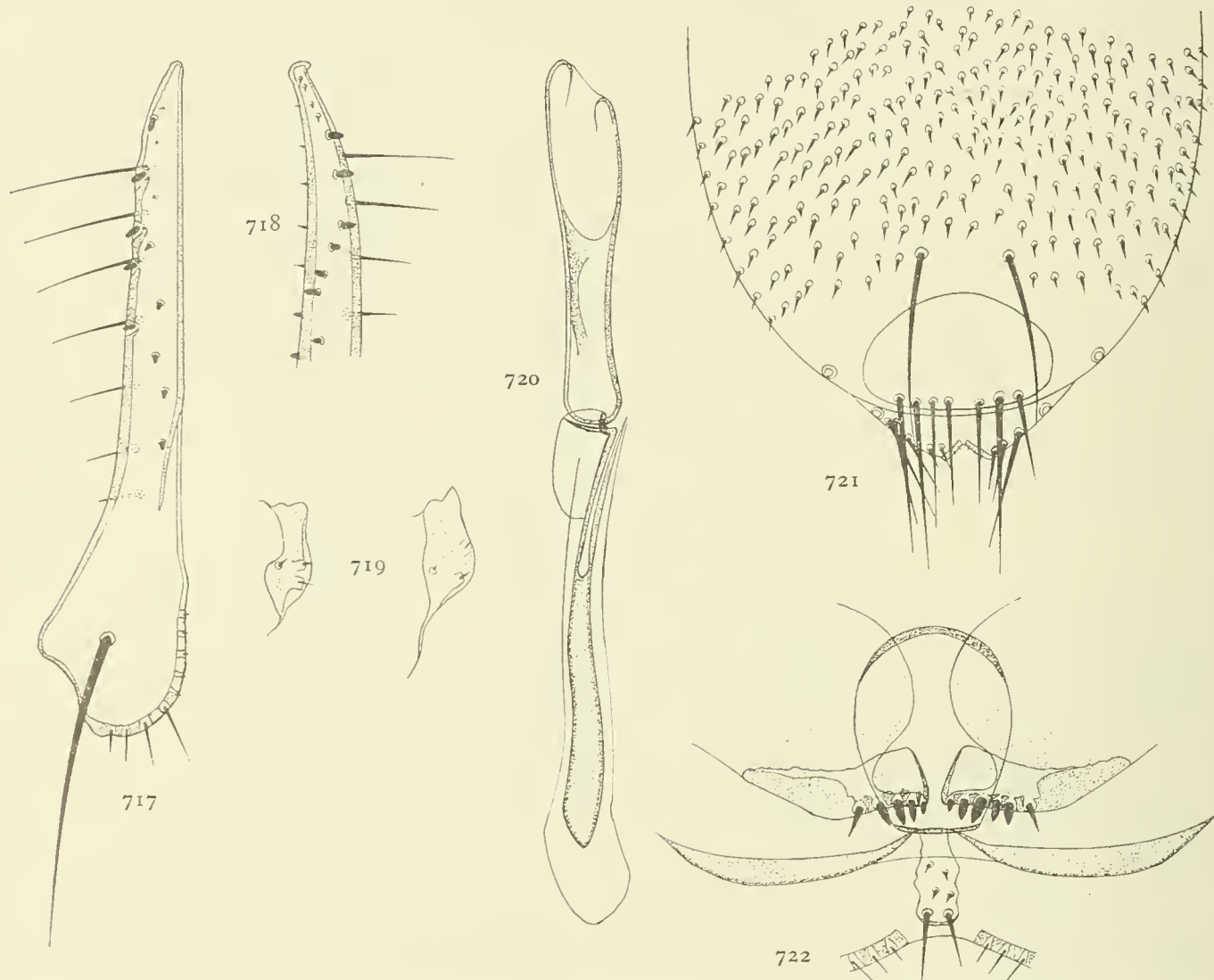
## EUCAMPSIPODA

## NYASALAND

Karonga, from large bat, Apr. 1909 and 1.vii. 1909,  
J. B. Davey, 1 ♂ 3 ♀ (Brit. Mus. 1909.285 and  
1947.36).

## SOUTH AFRICA

Salem, Cape Colony, from *Rousettus aegyptiacus*  
*leachi*, Sept. 1904, Albany Museum, Grahamstown,  
1 ♂ 3 ♀ (Brit. Mus. 1920.131).  
Knysna, Cape Colony, from *Eidolon helvum*,  
O. Thomas, N. C. Rothschild, 4 ♂ 8 ♀.



Figs. 717-722. *Eucampsipoda africana* Theodor. 717. male clasper, dorsal; 718. tip of same, profile; 719. paramere; 720. aedeagus; 721. female abdomen, posterior part, dorsal; 722. female genital plates.

***Eucampsipoda inermis* Theodor, 1955**

(Figs. 723-727)

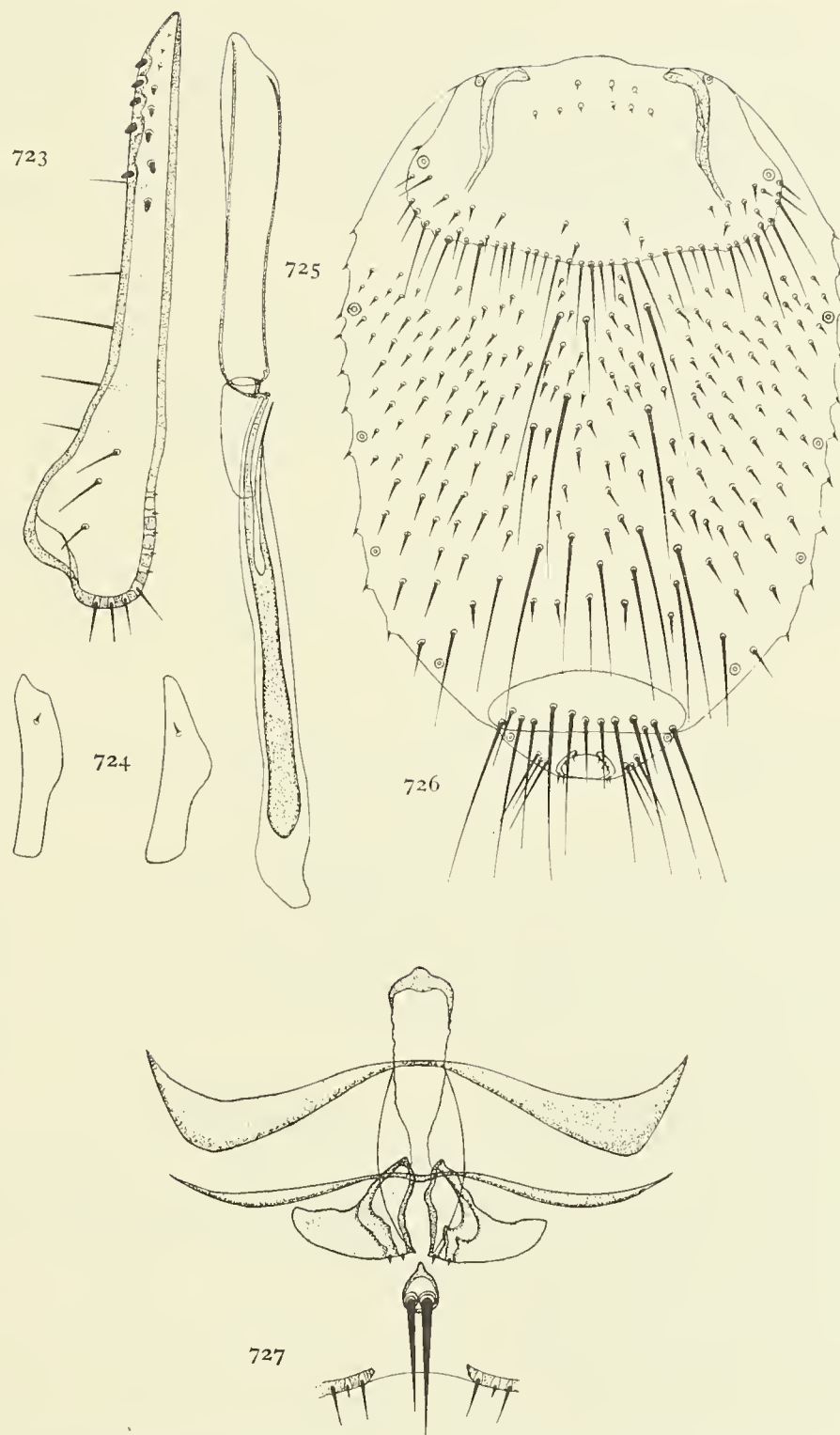
*Eucampsipoda inermis*. Theodor, 1955, *Parasitology*, **45**, 195.

*Eucampsipoda inermis*. Theodor, 1963, *Fieldiana, Zool.* **42**, 151.

Length, head and thorax as in *E. hyrtlui*. Labella of the proboscis 1.5 times as long as the theca.

*Male abdomen*. Tergite 1 with a dense row of moderately long setae at the posterior margin. Sternite 5 with only setae at the posterior margin.

*Genitalia*. Claspers 0.38 mm. long; only 2-3 short setae dorsally near the base, no long setae.



Figs. 723-727. *Eucampsipoda inermis* Theodor. 723. male clasper; 724. paramere; 725. aedeagus; 726. female abdomen, dorsal; 727. genital plates.

Pegs in 2 rows from the tip to near the middle of the clasper, those of the dorsal row smaller than those of the outer row. Aedeagus 0.35 mm. long, 8 times as long as wide at the base.

*Female abdomen.* Arrangement of the long setae on the dorsum similar to that of *E. sundaica* but the two longitudinal rows stand farther apart and the setae often form transverse rows of



four posteriorly. The area between the anterior long setae is covered with small spines. Tergite 6 with 12–14 setae posteriorly. Abdominal ctenidium with 36 spines. Ventral genital plates triangular, with only 2–3 minute ordinary spines. Dorsal plate very narrow, 2–3 times as long as wide. Anal sclerite small, isolated, with 2 setae.

Distribution and hosts: Philippines, Thailand, Java, New Guinea, from *Rousettus amplexicaudatus* and *Eonycteris spelaea glandifera*.

## MATERIAL IN THE COLLECTION

## PHILIPPINES

Soribao, Borongan, Samar Island, from dog-faced bat,\* 29.vi. 1948, A. Castro and P. Anonuevo, ♂ holotype, 1 ♂ 2 ♀ paratypes (Brit. Mus. 1948.554).

## THAILAND

Chiangelow caves, Chiang Mai, from bats, 1914, N. C. Rothschild, circ. 100 ♂ ♀.

## OTHER MATERIAL EXAMINED

## NEW GUINEA

Mornuna, from *Rousettus* no. 14879, 2.xii. 1956, 5. Archbold Expedition.

***Eucampsipoda latisterna* Schuurmans Stekhoven, 1938**

(Figs. 728–733)

*Eucampsipoda latisternum*. Schuurmans Stekhoven, 1938, *Capit. Zool.* **8**, 1.

*Eucampsipoda hyrtlai* (Kolenati). Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209.

*Eucampsipoda hyrtlai* (Kolenati). Scott, 1925, *Rec. Ind. Mus.* **27**, 351 (records from India and Ceylon).

*Eucampsipoda hyrtlai* (Kolenati). Ferris, 1924, *Phil. Jour. Science*, **24**, 73.

*Eucampsipoda hyrtlai* (Kolenati). Thompson, 1937, *Jour. Animal Ecol.* **6**, 337.

*Eucampsipoda hyrtlai orientalis*. Hiregaudar & Bal, 1956, *Agra Univ. Jour. Res. (Science)*, **5**, 1.

*Eucampsipoda latisternum* Schuurmans Stekhoven. Theodor, 1955, *Parasitology*, **45**, 195.

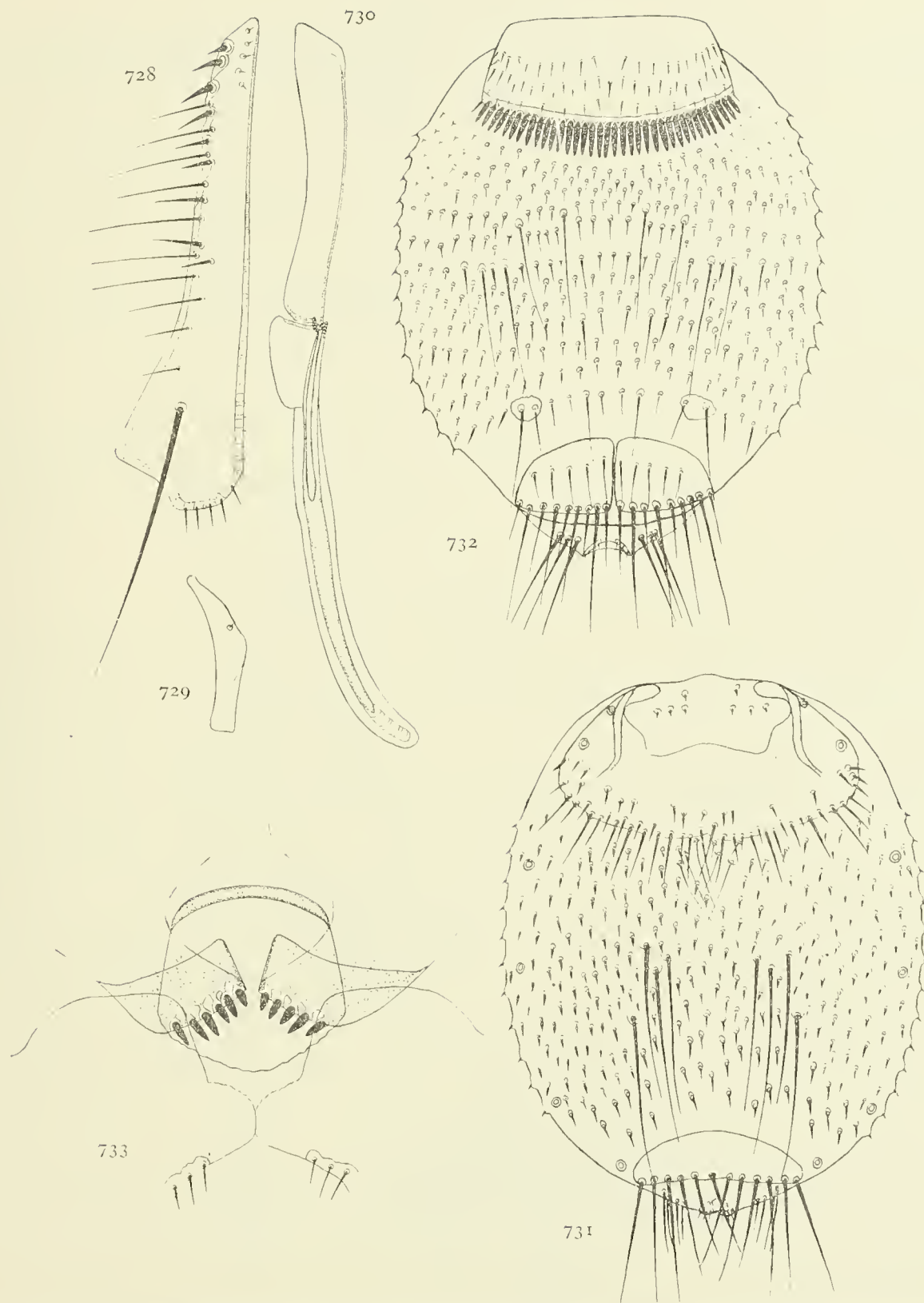
Length, head and thorax as in *E. hyrtlai*.

*Male abdomen and genitalia*. Sternite 5 with only setae at the median posterior process. Otherwise as in *E. hyrtlai*. Claspers rather short and broad, 0.3 mm. long. A row of short, strong spines (not pegs) which become longer and thinner towards the base and some minute spines near the tip. A row of setae at the outer side of the clasper. A long seta dorsally near the base. Aedeagus 0.35 mm. long, 6–7 times as long as wide.

*Female abdomen*. Dorsally resembling *E. hyrtlai*, except that the anterior group of setae on the connexivum consists of 8–10 fine setae in 2–3 rows. The posterior group consists of 3–5 setae which sometimes form diagonal rows. The area between the long setae is covered with short setae. Tergite 6 very short, transversely elliptical, with a row of 10–12 long setae posteriorly. Ventral genital plates broad, triangular, with a row of 6 pegs at the inner dorsal corner. Dorsal plate broad, nearly square. Anal sclerite absent.

Distribution and hosts: India, from *Rousettus leschenaulti*. Ceylon, from *Rousettus seminudus* and rarely from *Tylonycteris pachypus*. Burma and Java, from *Rousettus amplexicaudatus*. Thailand.

\* *Rousettus* or *Eonycteris* according to Hoogstraal, 1951, *Phil. Zool. Exped.* 1946–47. *Fieldiana, Zool.* **33**, 39.



Figs. 728-733. *Eucampsipoda latisterna* Schuurmans Stekhoven. 728. male clasper; 729. paramere; 730. aedeagus; 731. female abdomen, dorsal; 732. same, ventral; 733. genital plates.

## MATERIAL IN THE COLLECTION

## INDIA

Khandagiri, Puri, Orissa, from *Rousettus leschenaulti*,  
8.vi. 1912, F. H. Gravely, ex coll. Indian Museum,  
2 ♂ 1 ♀.

## CEYLON

Urugala, from *Rousettus seminudus*, 1.ii. 1914, E. W.  
Mayor, N. C. Rothschild, 4 ♂ 4 ♀.

Kandy, from bat, 11.ii. 1914, E. W. Mayor, N. C.  
Rothschild, 2 ♂ 3 ♀.

Peradeniya, from *Rousettus seminudus*, Apr. and Dec.  
1911, J. C. F. Fryer, 3 ♂ 1 ♀.

Peradeniya, from *Tylonycteris pachypus*, 20.xii. 1911,  
J. C. F. Fryer, 1 ♂.

Luduganga, from *Rousettus seminudus*, 6.i. 1920,  
R. Senior White, 1 ♀ (Brit. Mus. 1924.100).

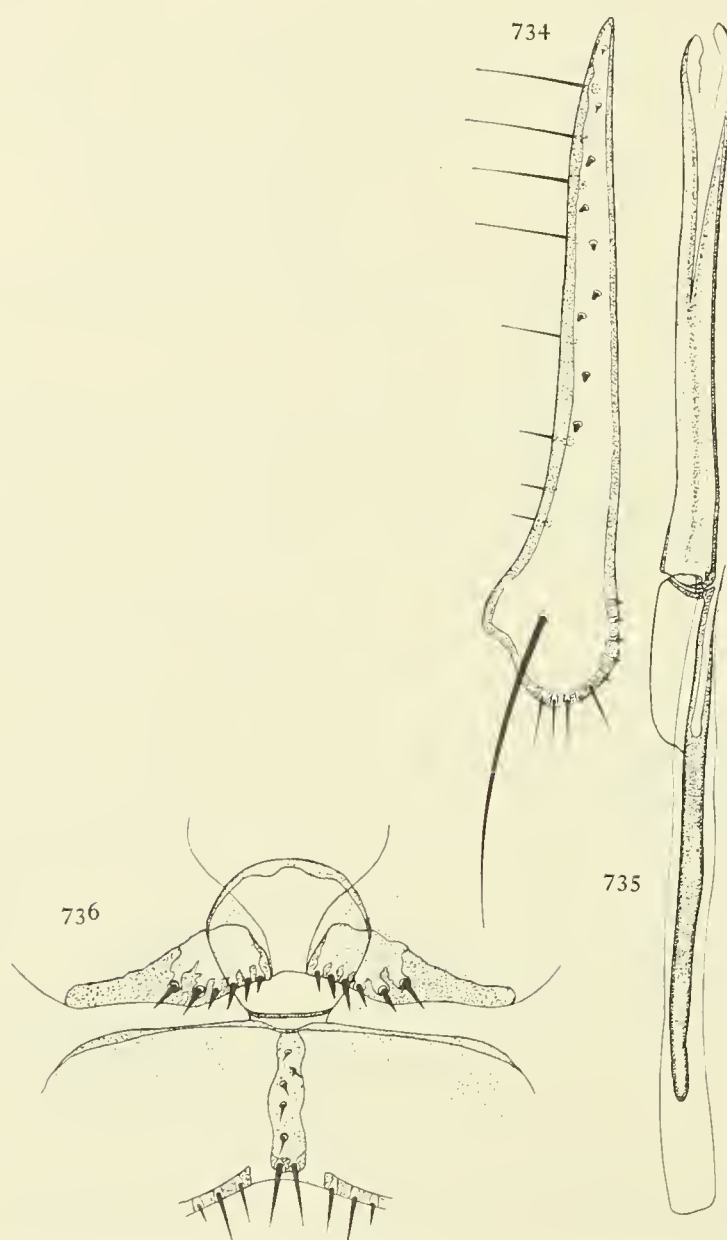
Mousakande, Gammaduwa, East Matale, from  
*Rousettus seminudus*, 27.viii. 1923, W. W. A.  
Phillips, 1 ♂ 3 ♀.

Gonagama, Kitulgala, from *Rousettus seminudus*,  
9.vi. 1925, W. W. A. Phillips, 7 ♀.

Passara, Uva, from *Rousettus seminudus*, 2.x. 1956,  
W. W. A. Phillips, 1 ♂ 1 ♀.

## THAILAND

Chiengelow caves, Chiang Mai, 1914, N. C. Roths-  
child, 1 ♂ 1 ♀.



Figs. 734-736. *Eucampsipoda madagascarensis* Theodor. 734. male clasper; 735. aedeagus; 736. female genital plates.



**Eucampsipoda madagascarensis** Theodor, 1955

(Figs. 734-736)

*Eucampsipoda madagascarensis*. Theodor, 1955, *Parasitology*, **45**, 195.*Eucampsipoda madagascarensis* Theodor. Theodor, 1957, *Parasitology*, **47**, 457.*Eucampsipoda hyrtlui* (Kolenati). Speiser, 1908, Voeltzkow, *Reise in Ostafrika*, **2**, 202.

Head, thorax and male abdomen as in *E. hyrtlui*, except for the lack of spines at the posterior margin of sternite 5.

*Male genitalia*. Claspers 0.38 mm. long, with a long seta dorsally near the base. Only a single row of minute spines and pegs on the dorsal side from the tip to the basal third. A row of setae laterally. Aedeagus very long and slender, 12-14 times as long as wide, 0.52 mm. long.

*Female abdomen*. The groups of long setae on the dorsum are not divided into lateral halves. The anterior group consists of about 20 thin setae in 2-3 rows and the posterior group of 7-10 long setae. Tergite 6 small, elliptical, with 6-8 long setae posteriorly. Genital plates triangular with short spines (not pegs) at the dorsal margin. Dorsal plate broadly rounded, as long as wide. Anal sclerite long, narrow, parallel-sided, with 2 setae posteriorly.

Distribution and host: Madagascar, from *Rousettus madagascarensis*.

Type series in the U.S. National Museum.

**Eucampsipoda penthetoris** Theodor, 1955

(Figs. 737-741)

*Eucampsipoda penthetoris*. Theodor, 1955, *Parasitology*, **45**, 195.

Length 2.2-2.5 mm. Head with only 2 setae at the anterior dorsal margin. Labella of the proboscis 1.5 times as long as the theca.

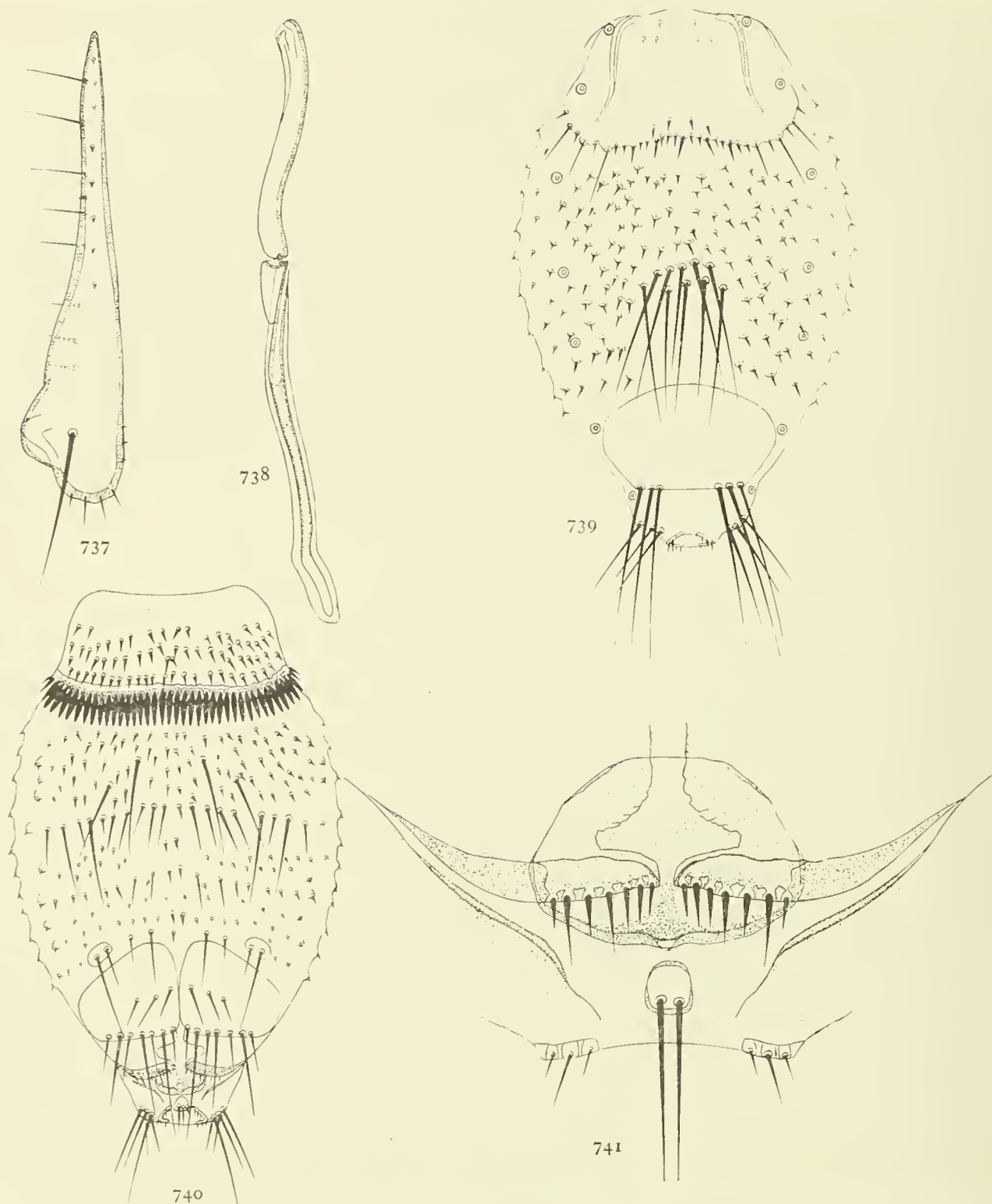
*Thorax*. Notopleural sutures close together anteriorly, bending sharply outwards posteriorly. The rings on the tibiae are closer to the base than in *E. hyrtlui*, the apical ring at about the middle of the tibia.

*Male abdomen*. Tergite 1 + 2 with only short setae in the middle of the hind margin. Sternite 1 + 2 with a ctenidium of 36-38 spines. Sternite 5 without a median process at the posterior margin and with longer and shorter setae laterally and only fine, short setae in the middle.

*Genitalia*. Claspers 0.35 mm. long, wide in the basal half, tapering to a very narrow, long point. A moderately long seta dorsally near the base and a row of minute spines from the tip to the middle of the dorsal surface. A row of hairs laterally in the apical half. Aedeagus short, 0.3 mm. long, very narrow, slightly curved, about 10 times as long as wide. Endophallus small, without teeth.

*Female abdomen*. Tergite 1 + 2 as in the male. Connexivum covered with short spines and with a group of 10-14 long setae in 2-3 rows in the middle. Behind the setae the dorsum is bare. Tergite 6 large, broadly elliptical, bare on the surface, with 2 groups of 3 setae at the sides of the hind margin. Sternite 1 + 2 with a ctenidium of 42-44 spines. Marginal rows of sternites 3-5 well developed. Sternite 6 with large, triangular lateral sclerites. Ventral genital plates long and narrow, curved, with a row of 5-8 short setae at the dorsal margin. They are visible externally. Dorsal plate broadly rounded. Anal sclerite rounded, isolated, with 2 setae.

Distribution and host: Malaya, Borneo, from *Penthetor lucasi*.



Figs. 737-741. *Eucampsipoda penthethoris* Theodor. 737. male clasper; 738. aedeagus; 739. female abdomen, dorsal; 740. same, ventral; 741. genital plates.

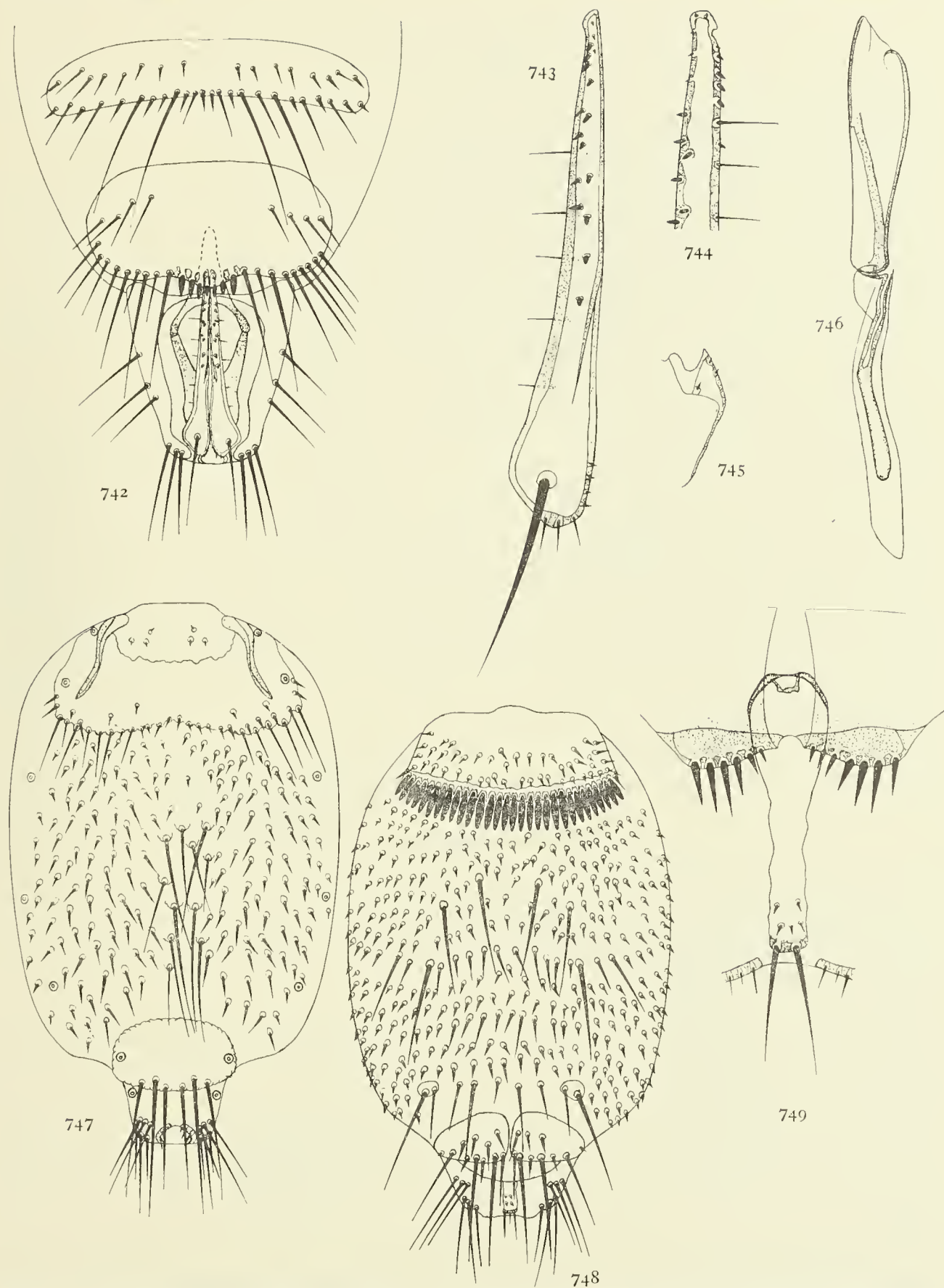
#### MATERIAL IN THE COLLECTION

##### MALAYA

Singapore, from *Penthethor lucasi*, H. N. Ridley,  
N. C. Rothschild, ♂ holotype, 1 ♂ paratype  
(Brit. Mus. 1913.450).

##### BORNEO

Tinjar caves, Sarawak, from *Penthethor lucasi*, 26.vi.  
1950, Harrison, Insoll, Johan, 1 ♀ paratype.



Figs. 742-749. *Eucampsipoda philippinensis* Ferris. 742. male abdomen, posterior part, ventral; 743. male clasper, dorsal; 744. tip of same, profile; 745. paramere; 746. aedeagus; 747. female abdomen, dorsal; 748. same, ventral; 749. genital plates.



**Eucampsipoda philippinensis** Ferris, 1924

(Figs. 742-749)

*Eucampsipoda philippinensis*. Ferris, 1924, *Phil. Jour. Science*, **24**, 73. (Female only, the male described is that of *E. sundaica*.)

*Eucampsipoda philippinensis* Ferris. Theodor, 1955, *Parasitology*, **45**, 195. (Description of the male.)

*Eucampsipoda philippinensis* Ferris. Theodor, 1963, *Feldiana Zool.* **42**, 151.

*Head*. Eyes very small. Only 2 setae at the anterior dorsal margin. Thorax as in *E. hyrtlui*.

*Male abdomen and genitalia*. Sternite 1 + 2 with a ctenidium of about 30 spines. Sternite 5 with a group of 6-8 strong spines in the middle of the posterior margin. Claspers 0.42 mm. long, with an obliquely truncate tip. A row of 8-10 pegs from the tip to the basal third. A second lateral row near the tip. A row of short setae laterally in the basal half and a long seta dorsally near the base. Aedeagus short and funnel-shaped, 0.33 mm. long, 6 times as long as wide near the base. Parameres with a triangular ventral and a rounded dorsal process.

*Female abdomen*. Tergite 1 + 2 with a marginal row of long and short setae laterally and only short setae in the middle. Connexivum covered with short spines which become longer posteriorly. A longitudinal group of 10-13 long setae in the middle of the dorsum. Tergite 6 elliptical, bare on the surface, with 6-8 setae at the posterior margin. Spiracles 6 lie inside the tergite, not in the connexivum as in other species. Abdominal ctenidium with 28-30 spines. Anal segment rather long, with long setae posteriorly and another row of 3-4 setae further basally. Ventral genital plates triangular, broader laterally and with a row of 6-8 spines which are longer laterally. Dorsal plate small, connected with the anal sclerite which bears 2 setae posteriorly.

Distribution and hosts: Philippines, from *Eonycteris robusta* and *Hipposideros diadema griseus*.

## MATERIAL IN THE COLLECTION

## PHILIPPINES

Cotabato, Mindanao, from *Eonycteris robusta*, 27.xii. 1946, F. Werner, 2 ♂ 2 ♀.

**Eucampsipoda sundaica** Theodor, 1955

(Figs. 750-755)

*Eucampsipoda sundaicum*. Theodor, 1955, *Parasitology*, **45**, 195.

*Eucampsipoda philippinensis*. Ferris, 1924, *Phil. Jour. Science*, **24**, 73. (Description of the male.)

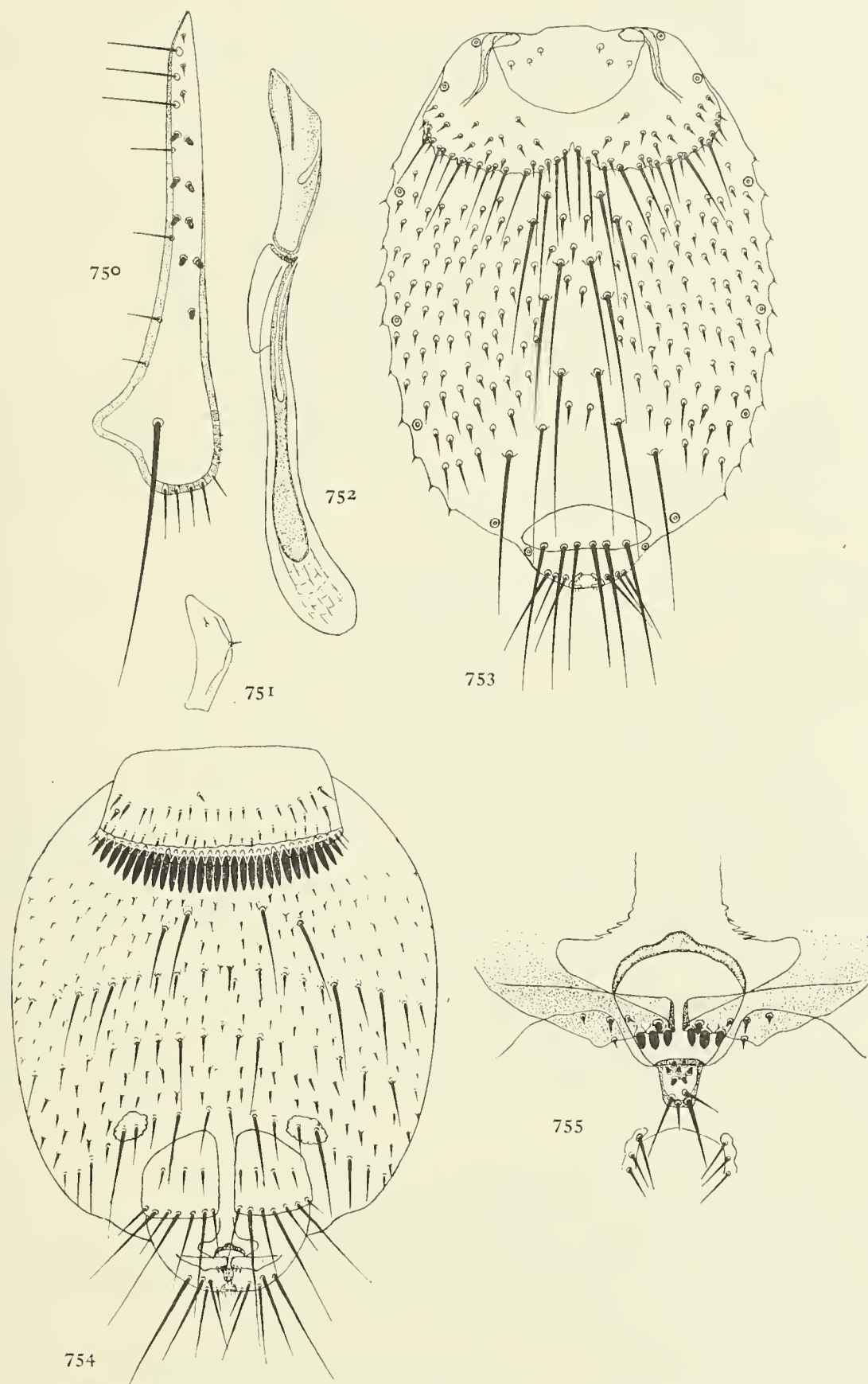
*Eucampsipoda sundaicum*. Theodor, 1963, *Feldiana Zool.* **42**, 151.

Head and thorax as in *E. hyrtlui*.

*Male abdomen*. Tergite 1 + 2 deeply indented posteriorly, with a row of setae which are longest in the middle. Abdominal ctenidium with 28-30 spines. Sternite 5 with fine hairs at the median posterior process.

*Genitalia*. Claspers short, 0.3 mm. long, tapering to a point, with 2 rows of large pegs in the middle half and hairs laterally. A long seta dorsally near the base. Aedeagus short and wide, 0.23 mm. long, 5 times as long as wide at the base and markedly wider apically. Apodeme wide.

*Female abdomen*. Tergite 1 + 2 as in the male. Connexivum covered with short spines which become markedly longer posteriorly. The group of long setae begins immediately behind tergite 1 + 2 and reaches to the posterior margin of the spinose area. The setae are very long, 10-17



Figs. 750-755. *Eucampsipoda sundaica* Theodor. 750. male clasper; 751. paramere; 752. aedeagus; 753. female abdomen, dorsal; 754. same, ventral; 755. genital plates.

## CYCLOPODIINAE

## EUCAMPSIPODA, DIPSELIPODA

in number and form 2 irregular longitudinal rows. Connexivum bare behind the long setae. Tergite 6 short, bare, with 4-6 long setae at the hind margin. Sternite 1 + 2 with a ctenidium of 30-33 spines. Marginal rows of sternites 3-5 well marked. Ventral genital plates narrow, triangular, with 3-4 short pegs near the inner dorsal corner. Dorsal plate rounded, anal sclerite short and square, with 2-3 setae posteriorly and 7-10 small pegs on the surface. The ventral plates are visible externally.

Distribution and hosts: India, Burma, Thailand, Malaya, Sumatra, Philippines, from *Cynopterus sphinx* and *Eonycteris spelaea*.

Type series in the Museo Civico di Storia Naturale, Genoa.

## MATERIAL IN THE COLLECTION

## INDIA

Madras, from *Cynopterus sphinx*, G. C. Jerdon, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).

## SUMATRA

Balige, from *Eonycteris spelaea*, E. Modigliani, ex coll. Genoa Museum, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

## THAILAND

Chiengelow caves, Chiang Mai, 1914, N. C. Rothschild, 12 ♂ 8 ♀.

## OTHER MATERIAL EXAMINED

Burma, from *Pteropus* sp. (type series). Malaya, from *Eonycteris spelaea*. Philippines, Mindanao, from *Rousettus amplexicaudatus* and *Eonycteris spelaea glandifera*; Palawan, from *Eonycteris spelaea glandifera*.

GENUS **DIPSELIPODA** Theodor, 1955

*Dipseliopoda*. Theodor, 1955, *Parasitology*, **45**, 195. Type species: *D. biannulata* (Oldroyd, 1953).

Head moderately compressed laterally. Eyes with 2 large, well-separated lenses on a wide pigmented base, protruding from the surface. Palps of *Eucampsipoda* type. Labella of the proboscis either shorter or longer than the theca. Thorax as in *Eucampsipoda*. Spines of thoracic and abdominal ctenidia thick and blunt. One longer and 1 or 2 shorter notopleural setae. Legs also as in *Eucampsipoda*, tibiae with 2 rings and short setae in the middle. Segmentation of male abdomen as in *Eucampsipoda*. Sternite 5 with armature of spines at the posterior margin. Genitalia of *Eucampsipoda* type, with an endophallus which continues in a long tube or without endophallus. Abdomen of female with tergite 6 and sternites 6 and 7 present. Tergites 1 and 2 fused. Sternite 7 (genital plates) divided into lateral sclerites or not, covering the genital opening from below as in *Cyclopodia*.

KEY TO THE SPECIES OF *DIPSELIPODA*

## MALES

1. Sternite 5 with 2 broad lateral processes posteriorly and a deep concavity between them. A row of about 60 long, curved, dagger-like spines along the concavity (Figs. 759, 760).  
**D. arcuata** (p. 429)  
Sternite 5 pentagonal, without posterior processes. **2**
2. Sternite 5 with a row of about 20 short, clubbed spines at the posterior margin. Two processes with 4-6 clubbed spines at the sides of the ventral surface of the anal segment. Claspers thick and straight, with blunt tip. Aedeagus of *Eucampsipoda* type, with long, tapering endophallus (Figs. 766-770).  
**D. biannulata** (p. 431)



Sternite 5 with short posterior margin which bears only 8–10 clubbed spines. Processes at the ventral surface of the anal segment absent. Claspers thick at the base, tapering sharply to a long pigmented point, thickly covered laterally with short spines. Aedeagus long and narrow, tapering to a point, without endophallus (Figs. 775–779).

**D. setosa** (p. 434)

## FEMALES

1. Dorsum of the abdomen covered with short setae only. Tergite 6 short, with 2 notches at the anterior margin and about 20 setae posteriorly. Sternite 7 (genital plate) undivided, with about 12 setae at the posterior margin. Anal sclerite large, elliptical, with numerous small hairs on the surface (Figs. 756–758).

**D. arcuata** (p. 429)

Long setae on the dorsum of the abdomen.

**2**

2. A group of 10–14 long setae in the middle of the dorsum. Tergite 6 elliptical, with 9–12 setae posteriorly. Sternite 7 divided into rectangular halves, each with 5–8 setae posteriorly. Anal sclerite small, with 2 longer and some shorter setae posteriorly (Fig. 761–765).

**D. biannulata** (p. 431)

Dorsum of the abdomen with a dense group of about 300 very long setae. Tergite 6 short, without any setae. Sternite 7 broad, rounded, with long and shorter setae posteriorly (Figs. 771–774).

**D. setosa** (p. 434)

**Dipseliopoda arcuata** Theodor, 1955

(Figs. 756–760)

*Dipseliopoda arcuata*. Theodor, 1955, *Parasitology*, **45**, 195.

*Dipseliopoda arcuata*. Theodor, 1957, *Parasitology*, **47**, 457.

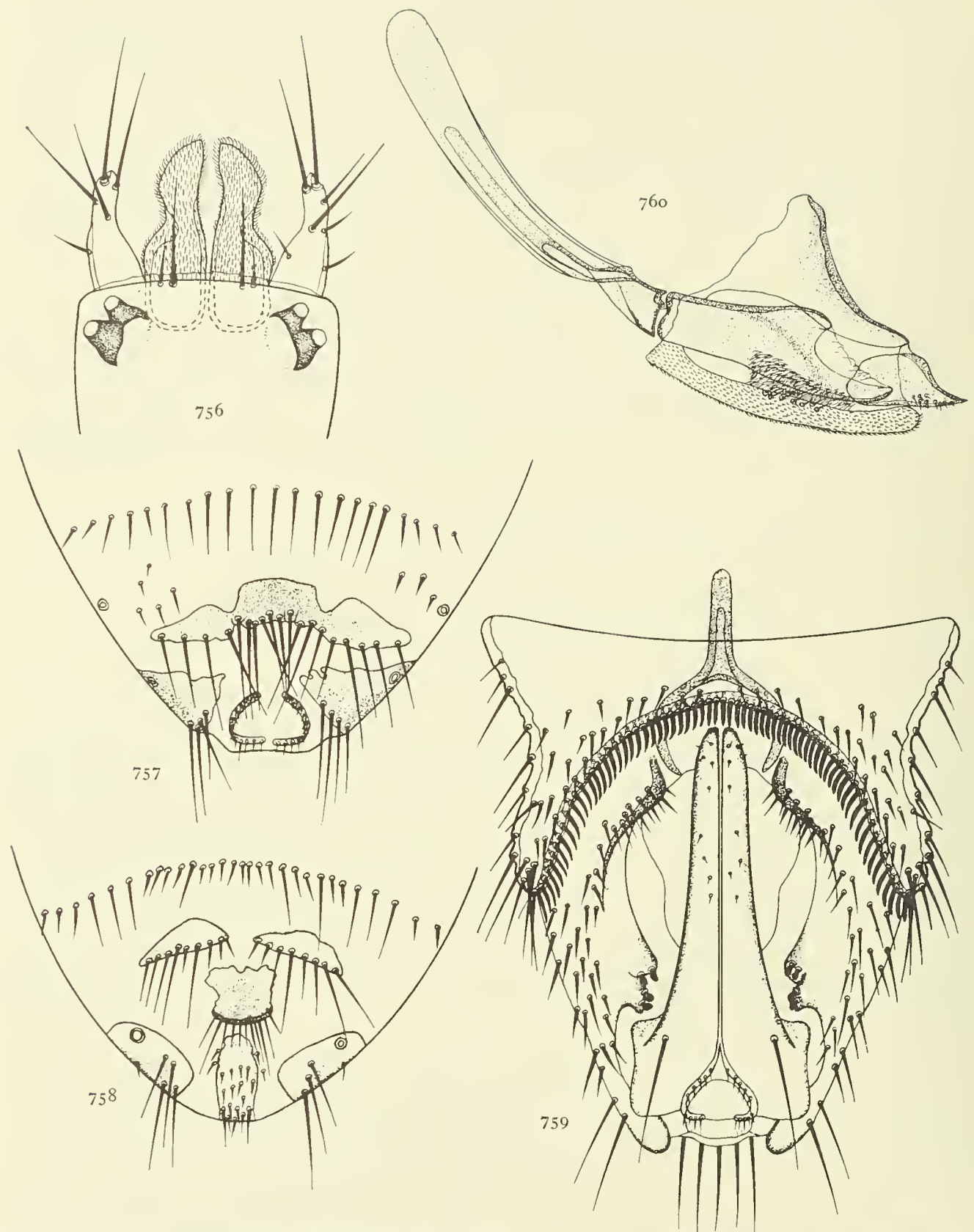
Length 3–3.5 mm. Colour brown. Head and thorax as in *D. biannulata*. Labella of the proboscis two-thirds of the length of the theca.

*Male abdomen*. Tergites 2–6 very short, with marginal rows of moderately long setae, bare on the surface. Anal segment very long, about as long as half the abdomen. Sternite 1 + 2 with a ctenidium of about 50 spines. Sternite 5 with 2 broad lateral processes posteriorly, with a wide concavity between them, at which stand about 60 curved, long, dagger-like spines. Some moderately long setae at the tip of the lateral processes. 2 rounded processes with short setae anteriorly on the ventral surface of the anal segment and 2 other processes with 3–4 clubbed spines, as in *D. biannulata*, further posteriorly at the sides of the anal segment.

*Genitalia*. Claspers long and straight, with a long seta dorsally near the base and with only a few minute hairs further apically. Basal arc rounded, with long anterior process. Phallobase and aedeagus as in *D. biannulata*. Parameres triangular.

*Female abdomen*. Tergite 1 + 2 with a row of moderately long and shorter setae posteriorly. Dorsum of the abdomen covered with short setae which become longer posteriorly. There are no long setae. Tergite 6 very short, tapering laterally, with a row of about 20 setae posteriorly. Abdominal ctenidium with about 55 spines. Sternite 6 bare, with 2 narrow lateral triangular sclerites with setae at the posterior margin. Sternite 7 irregularly square or trapezoidal, with rounded posterior margin with about 10–12 long and short setae. Anal sclerite large, elliptical, with numerous short setae.

Distribution and hosts: East Africa, from *Hypsignathus monstrosus*, *Epomophorus* sp.



Figs. 756-760. *Dipseliopoda arcuata* Theodor. 756. head, dorsal; 757. female abdomen, posterior part, dorsal; 758. same, ventral; 759. male sternite 5 and genital area; 760. male genitalia.

## MATERIAL IN THE COLLECTION

## ETHIOPIA

Addis Ababa, from bat, 20.vii. 1912, Jannasch & Goetz, N. C. Rothschild, ♂ holotype, 1 ♂ 4 ♀ paratypes.  
 Sidamo, from *Epomophorus* sp., 26.iv. 1959, F. R. Allison, 1 ♂ 1 ♀.

***Dipseliopoda biannulata* (Oldroyd, 1953)**

(Figs. 761-770)

*Cyclopodia biannulata*. Oldroyd, 1953, *Proc. R. Ent. Soc. Lond. B*, **22**, 59.

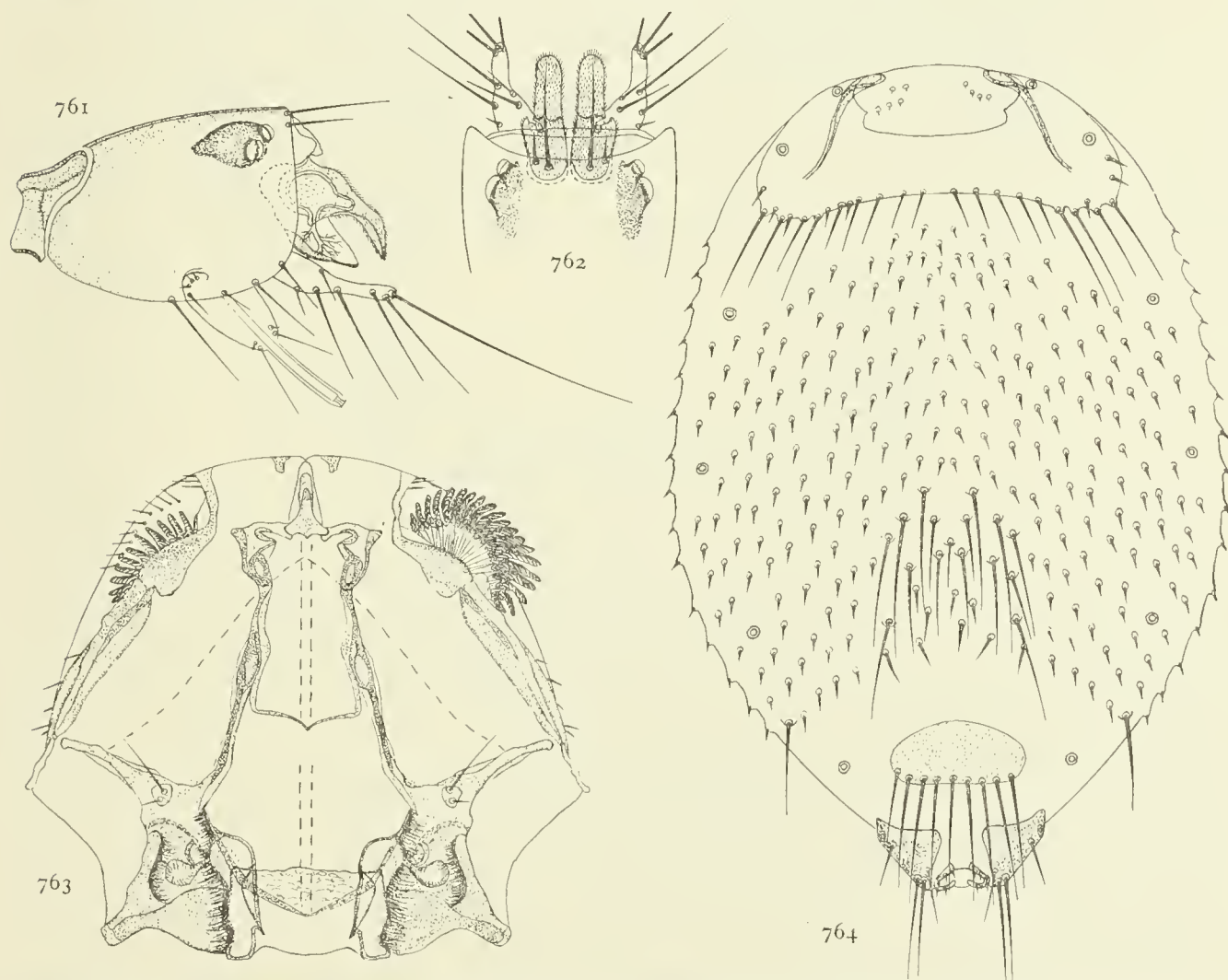
*Dipseliopoda biannulata* (Oldroyd). Theodor, 1955, *Parasitology*, **45**, 195.

*Dipseliopoda biannulata* (Oldroyd). Theodor, 1957, *Parasitology*, **47**, 457.

Length 3.5-4 mm. Colour dark brown.

**Head.** The lenses are large, half spherical, more clearly separated than in *Basilina*, but not as far as in *Cyclopodia*. The area surrounding the eyes is pigmented. Labella of the proboscis slightly shorter than the theca.

**Thorax.** Mesonotum widening posteriorly. 1 long and 1 or 2 short notopleural setae. Tibiae long, cylindrical, with 2 rings and moderately long setae in the middle.

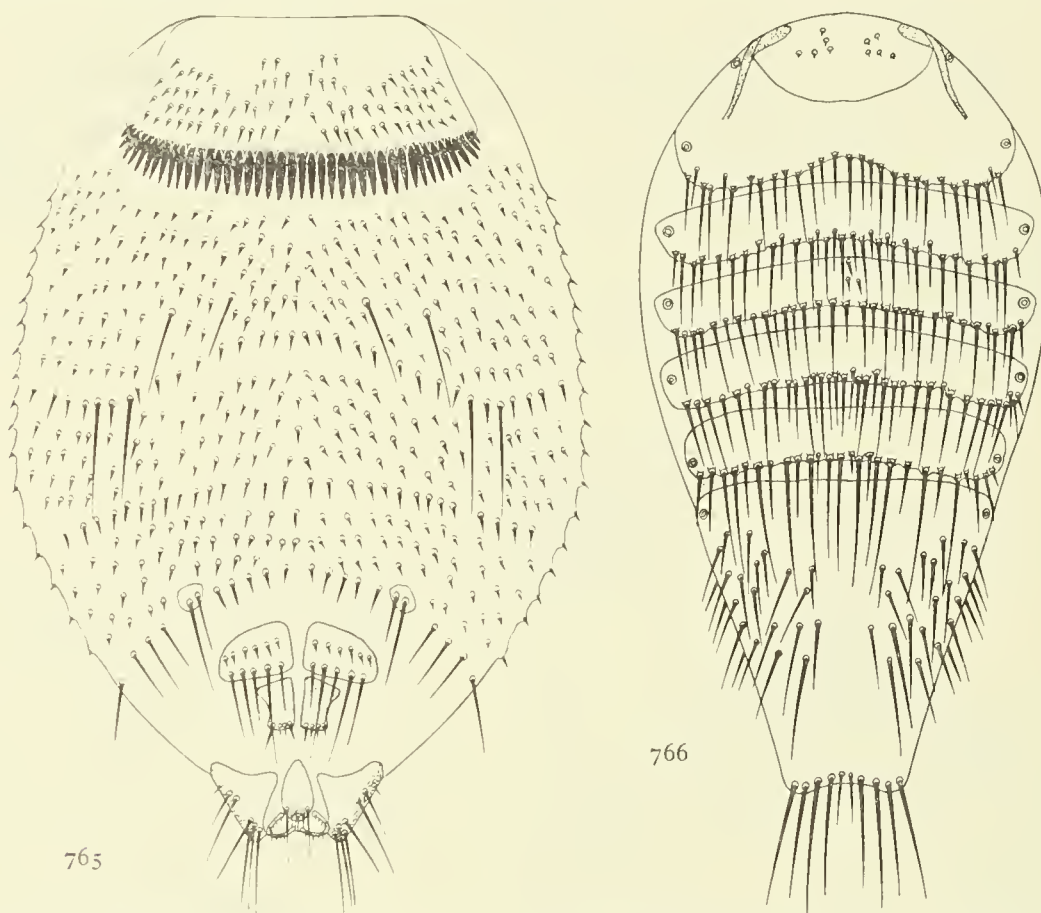


Figs. 761-764. *Dipseliopoda biannulata* (Oldroyd). 761. head, profile; 762. same, dorsal; 763. thorax, dorsal; 764. female abdomen, dorsal.



*Male abdomen.* Tergites with marginal rows of moderately long setae, bare on the surface. Sternite 5 pentagonal, with a row of about 20 thick, clubbed spines at the posterior margin. Anal segment ventrally with 2 broad processes at the sides, which bear 4–6 spines like those on sternite 5.

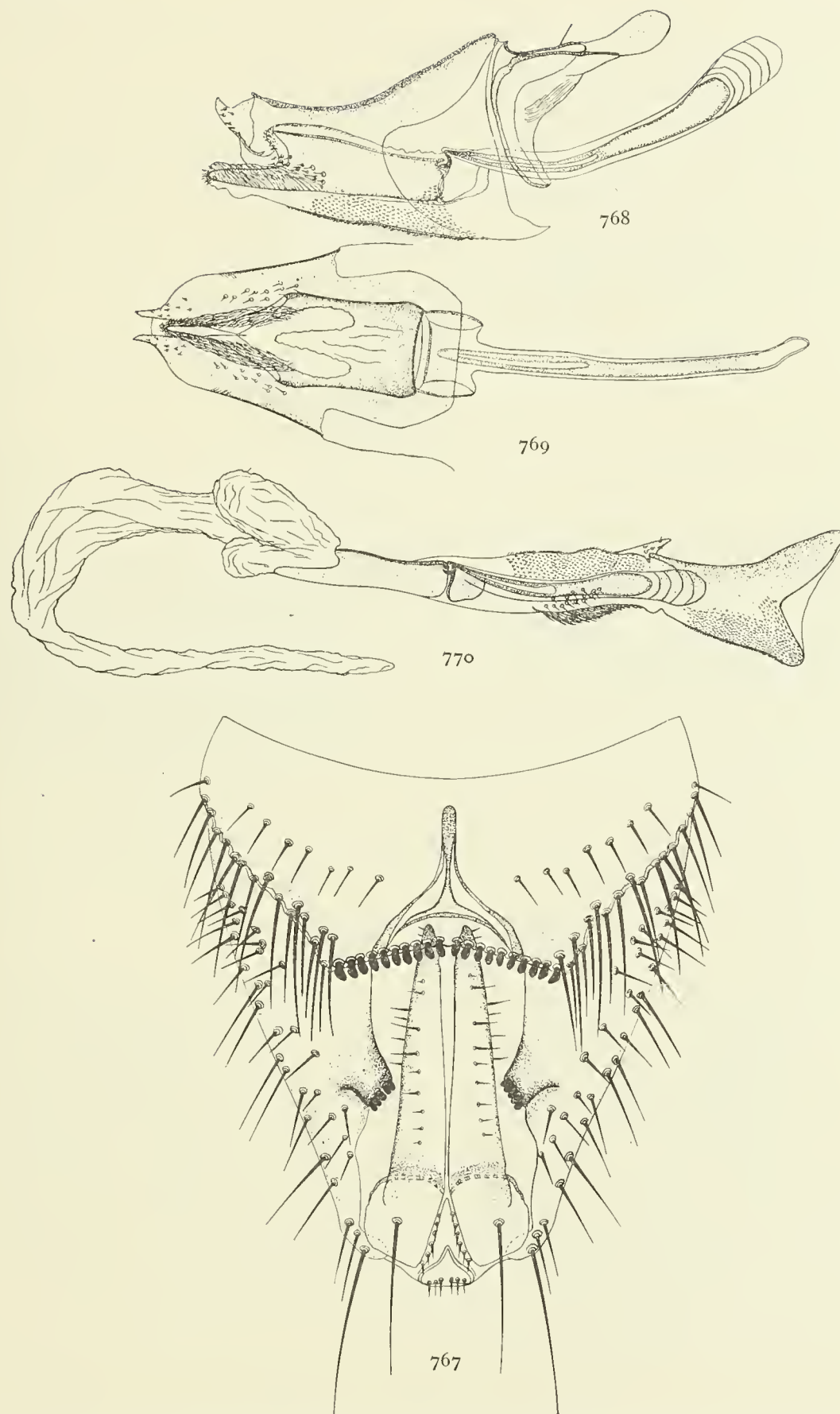
*Genitalia.* Basal arc triangular, with a long anterior process. Claspers thick and straight, tapering to a blunt, dark point. A long seta dorsally near the base and a row of short setae on the dorsal surface. Phallobase broad, with minute spines at the ventral surface. Aedeagus of



Figs. 765, 766. *Dipseliopoda biannulata* (Oldroyd). 765. female abdomen, ventral; 766. male abdomen, dorsal.

*Eucampsipoda* type, with a long ventral apical process. Connective membrane with 2 strips of strong spines ventrally and some long, thin spines laterally. Endophallus without spines, with 2 dorsal and 2 ventral lobes, continuing into a long, tapering tube. Parameres triangular, with upturned tip.

*Female abdomen.* Tergite 1 + 2 with concave posterior margin which bears short, widely spaced setae in the middle and longer setae laterally. Dorsum covered with short spines and a group of 10–14 long setae in the middle posteriorly. Tergite 6 elliptical with a marginal row of 9–12 setae. Abdominal ctenidium with 40–44 spines. Sternites 3–5 with marginal rows of spines. 2 setae at each side in the marginal row of sternite 3, and several such setae at each side in the marginal row of sternite 5. 2 setae on each side are placed on a small sclerotized area. Sternite 6 divided into rounded or triangular lateral sclerites with marginal rows of longer and shorter setae. A transverse row of 5–6 short setae on the surface. Ventral genital plate divided into



Figs. 767-770. *Dipseliopoda biannulata* (Oldroyd). Male. 767. sternite 5 and genital area; 768. genitalia, resting position; 769. same, dorsal; 770. same, extended position.

rectangular lateral sclerites with a marginal row of short setae. Anal sclerite elliptical, with 2 longer and 2 shorter setae posteriorly.

Distribution and hosts: Tropical Africa between lat. 10° North and South, on species of *Rousettus*, *Epomophorus* and *Chaerephon*, rarely on species of *Rhinolophus*.

## MATERIAL IN THE COLLECTION

## NIGERIA

Ondo, Ado Ekiti, from unidentified bat, 24.vi. 1949,  
P. I. M. Maclaren, ♂ holotype, 1 ♂ 2 ♀ paratypes.

## UGANDA

Ruwenzori, from bat, 8.ii. 1906, A. F. R. Wollaston,  
N. C. Rothschild, 1 ♂ 1 ♀.

**Dipseliopoda setosa** Theodor, 1955

(Figs. 771-779)

*Dipseliopoda setosa*. Theodor, 1955, *Parasitology*, **45**, 195.

*Dipseliopoda setosa* Theodor. Theodor, 1957, *Parasitology*, **47**, 457.

Length 3.5-4.5 mm. Colour dark brown.

*Head*. Labella of the proboscis 1.5 times as long as the theca. Thorax as in *D. biannulata*.

*Male abdomen*. Tergite 1 + 2 rounded posteriorly, with a marginal row of long and short setae and some long, thick spines between the setae. Surface covered with setae in the posterior half. Tergites 3-6 short, with dense rows of long setae posteriorly and short setae on the surface. Anal segment very narrow, nearly cylindrical, about as long as tergites 3-6 together. Sternite 5 triangularly produced posteriorly, with a row of 8-10 thick, clubbed spines at the posterior margin.

*Genitalia*. Claspers thick at the base, tapering to a long, pigmented point. A long seta dorsally near the base. The claspers are thickly covered with spines and setae at the sides and on part of the dorsal surface. Phallobase conical, with small spines ventrally and at the sides and connected with the aedeagus by a membrane as in *Eucampsipoda*. Basal arc with a very long apodeme, much longer than in any other species of Nycteribiidae examined. Aedeagus very long and narrow tapering to a fine point. Endophallus absent. The aedeagus is partly fused with the apodeme.

*Female abdomen*. Tergite 1 + 2 with a row of long setae posteriorly, and with a gap in the middle. A few spines among the setae and on the posterior part of the surface. The connexivum behind the tergite is bare beneath the long setae. Dorsum of the abdomen covered with a dense group of about 300 setae in the posterior part and with short spines in front of the long setae and on the pleurae. Tergite 6 wide and short, without any setae. Abdominal ctenidium with 38 thick, blunt spines. Sternite 6 divided into triangular lateral sclerites with long and short setae posteriorly. Sternite 7 (genital plate) wide, rounded posteriorly. Dorsal genital plate narrow, strip-like, with numerous short spines.

Distribution and hosts: East Africa, from *Rousettus lanosus* and *Eidolon helvum*.

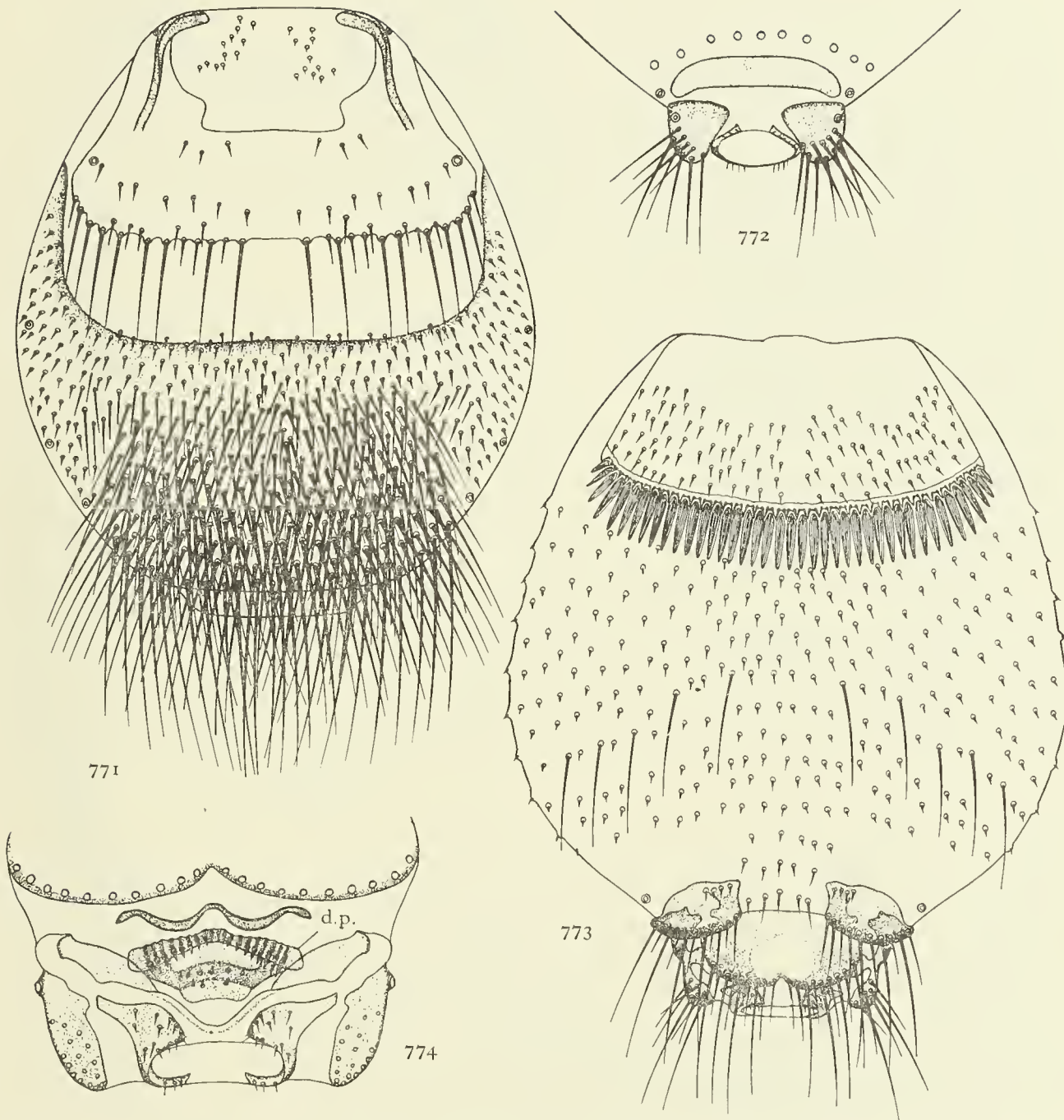
Type series in the U.S. National Museum.

## MATERIAL IN THE COLLECTION

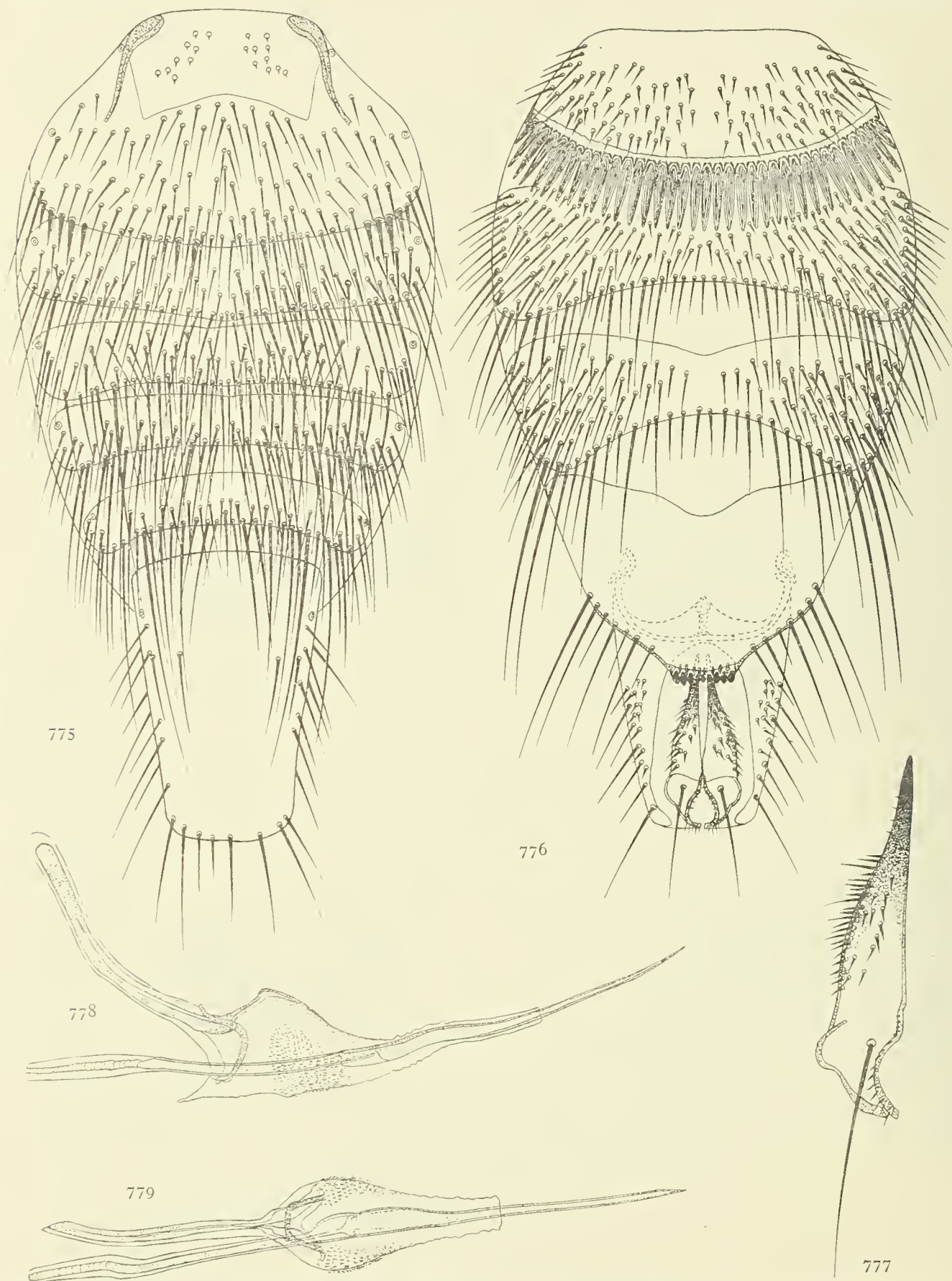
## UGANDA

Ruwenzori, from bat, 8.ii. 1906, A. F. R. Wollaston, N. C. Rothschild, 1 ♀.





Figs. 771-774. *Dipseliopoda setosa* Theodor. Female. 771. abdomen, dorsal; 772. tergite 6 and anal segment; 773. abdomen, ventral; 774. genital plates.



Figs. 775-779. *Dipseliopoda setosa* Theodor. Male. 775. abdomen, dorsal; 776. same, ventral; 777. clasper; 778. genitalia, partly extended; 779. same, dorsal.



GENUS **CYCLOPODIA** Kolenati, 1863

*Cyclopodia*. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9. Type species: *Cyclopodia sykesii* (Westwood, 1835).

*Head*. Compressed dorso-ventrally. Eyes consisting of 2 more or less deeply separated ocelli. Palps either broad and laterally compressed, or slender and tapering. They bear marginal setae and a long or short terminal seta. Antennae with a broad dorsal process of the basal segment. Labella of the proboscis as long as, or longer than, the theca.

*Thorax*. Rounded anteriorly. Thoracic ctenidia with thick, blunt spines. Notopleural sutures diverging posteriorly. 1-4 notopleural setae in most species, 7-8 in one species, absent in another. They are placed close to the haltere groove at the base of the mesopleural sutures. Haltere groove either open or partly or completely closed by a cover (Figs. 781-783). Oblique sutures open, sometimes rounded anteriorly. Coxae 1 very long, club-shaped. Tibiae long, nearly parallel-sided, slightly compressed laterally, with 3 rings of weaker integument in the middle. Some moderately long or short setae at the basal margin of the rings.

*Abdomen*. Tergites 1 and 2 fused in both sexes. Post-spiracular sclerite without setae in most species. Segmentation of the female abdomen much reduced, only the basal and anal sclerite always sclerotized. Tergite 6 and sternites 5-7 or 6-7 present in one subgenus. Abdominal ctenidium with thick, blunt spines. Sternite 7 normal or transformed into a genital plate which bears spines posteriorly. Abdomen of male with normal segmentation. A row of spines of varying form at the posterior margin of sternite 5 in one subgenus, absent in the other.

*Genitalia*. Aedeagus either membranous with a rod-like structure in its wall, without apodeme, completely invaginated inside the abdomen in the resting position, phallobase with an apical hook (subgenus *Cyclopodia* s.str.) or aedeagus partly or completely sclerotized, with apodeme and a phallobase which is bifid in some species (subgenus *Leptocyclopodia*). A detailed description of the structure of the genitalia has been given previously (Theodor, 1959).

KEY TO THE SPECIES OF THE GENUS *CYCLOPODIA*

Males of the species of the subgenus *Cyclopodia* have very few characters useful for identification. Particularly the males of the *sykesii* group are all very similar and difficult to distinguish. The males of *C. sykesii* and *C. horsfieldi* are indistinguishable by any character, including those of the genitalia. The aedeagus rod and the extent of the field of spines of the connecting tube are useful in some species (Figs. 784-790). They are clearly visible through the body wall in cleared preparations. The form of the phallobase and the arrangement of the setae on its base are also useful in some instances. In addition to this uniformity, the great variability of the species makes the chaetotactic characters even more unreliable. The form of the claspers and their thickness, i.e. the relation between the length and thickness at the base, varies to such an extent that it is practically useless, except in a few instances.

The females are easier to identify. The long setae on the abdomen give good characters for the separation of the species, but here again, the great variability of the species has to be taken into account. The form of the genital plate affords specific characters in some instances.



## MALES

1. Anal segment broadly conical, less than twice as long as wide at the base. Tergites 5 and 6 much shorter than tergite 4. A row of thick, short spines at the hind margin of sternite 5. Genitalia with a membranous aedeagus without apodeme. (Subgenus **Cyclopodia**) 2  
 Anal segment slender, nearly cylindrical, twice as long as wide at the base or longer. Tergite 5 as long as, or longer than, tergite 4. A row of spines at the hind margin of sternite 5 is absent. Aedeagus partly or wholly sclerotized and with an apodeme. (Subgenus **Leptocyclopodia**) 15
2. Haltere groove completely closed by a cover. Marginal rows of some or all abdominal tergites interrupted in the middle. (Exception *C. australis*.) Oriental and Pacific Region (Figs. 781, 793, 795-798). (sykesii group) 3  
 Haltere groove either partly closed or open. Marginal rows of the abdominal tergites continuous (Figs. 782, 783, 820). 8
3. Cover of the haltere groove attached along its whole length. Only marginal row of tergites 2 and 3 interrupted in the middle. Only 6 spines at the hind margin of sternite 5. Vertex bare anteriorly, but with some setae in its posterior part (Figs. 811, 813). **C. minor** (p. 455)  
 Cover of haltere groove attached only in its posterior third. Vertex with setae on the anterior part of the surface. 4
4. Notopleural setae absent. Marginal rows of abdominal tergites consisting of short spines only on tergites 2 and 3, of a group of setae in the middle third on tergite 4 and continuous rows on tergites 5 and 6. Only 8-10 hairs on the vertex between the eyes. Spines on the connecting membrane of the aedeagus short and triangular (Figs. 791, 804). **C. australis** (p. 450)  
 Notopleural setae present. Marginal rows on abdominal tergites 2-6 broadly interrupted in the middle. Spines of connecting membrane of aedeagus long and narrow (Figs. 792, 795). 5
5. Vertex covered with setae except in a posterior narrow strip. Most setae at the posterior lateral corners of tergite 2 longer than half the length of the marginal setae of tergite 3. Hook of phallobase slender. 6  
 Only the anterior half or less of the vertex covered with setae. Most setae at the posterior lateral corners of tergite 2 shorter. Hook of phallobase broad and short. 7
6. Aedeagus rod 1.3-1.5 mm. long. Field of spines of the connecting tube as long as the rod. 20-30 minute spines on tergite 1, the posterior spines of the group much longer than the anterior ones (Fig. 784). **C. sykesii** (p. 444), **C. horsfieldi** (p. 452)  
 Aedeagus rod 0.85 mm. long. Only 18-24 minute spines on tergite 1. The posterior ones not much longer than the anterior spines (Fig. 786). **C. similis** (p. 459)
7. A triangular group of about 20-30 spines on the anterior half of the vertex. Aedeagus rod 0.72-0.85 mm. long. Field of spines of the connecting membrane as long as the rod or nearly so (Figs. 785, 789, 801). **C. albertisii** (p. 448), **C. ponapensis** (p. 458)  
 Less than half the vertex covered with about 25-30 setae. Aedeagus rod 0.8-0.9 mm. long, covered only in two-thirds or three-quarters of its length by the field of spines (Figs. 787, 788). **C. oxycephala** (p. 457), **C. bougainvillensis** (p. 450)  
 Vertex as above, but with only 12-15 setae. Aedeagus rod 0.6-0.7 mm. long, covered only in half its length by the field of spines (Figs. 790, 808, 809). **C. inclita** (p. 453)
8. Haltere groove partly closed by a flap which is attached to the notopleural suture along its whole length and by a large rounded bulge opposite. Eyes small (Fig. 782). (**pembertoni** group) 9  
 Haltere group open (Fig. 783). 10
9. Vertex and anterior margin bare. 2 notopleural setae. About 10 short, thick club-shaped spines on sternite 5. Claspers thick, 4 times as long as wide at the base (Fig. 820). **C. pembertoni** (p. 460)  
 A row of about 10 setae at the anterior dorsal margin of the head and a double row of about 16 short setae between the eyes. 7-8 notopleural setae in a group. Marginal rows of tergites 2-4 consisting of short spines, those of tergites 5 and 6 longer. A row of about 18 very long, truncate spines on sternite 5. Claspers slender, about 6 times as long as wide at the base. Hook of phallobase spatulate (Figs. 824-828) **C. macracantha** (p. 462)

## CYCLOPODIINAE

## CYCLOPODIA

10. Large species, 3.5–4.5 mm. long. Ethiopian Region and Madagascar. (greeffi group) 11  
Small species, 2–3 mm. long. Oriental and Pacific Region. (tenuis group) 12
11. 2 setae at the anterior dorsal margin of the head. 8–10 short, thick spines on sternite 5. Claspers slender, 6.5 times as long as wide at the base. Aedeagus rod long (1.2 mm.), curved, tapering to a point. Hook of phallobase long. Ethiopian Region (Figs. 44–46, 780, 783, 833, 834, 837).  
*C. greeffi* (p. 465)  
Anterior dorsal margin of the head bare. About 20 spines at the hind margin of sternite 5. Claspers thick and short, 3 times as long as wide at the base, with a group of spines at the rounded tip. Aedeagus rod short (0.5 mm.). Madagascar (Figs. 841–843). *C. dubia* (p. 469)
12. Length 3 mm. A truncate process with 8 short, club-shaped spines at the hind margin of sternite 5. Aedeagus rod 0.6 mm. long. Phallobase with V-shaped double row of about 16 setae. Hook of phallobase short, pointed. Basal arc triangular with rounded anterior process (Figs. 851, 854).  
*C. truncata* (p. 476)  
Length 2–2.5 mm. Posterior margin of sternite 5 convex, but without truncate process. Aedeagus rod shorter, 0.33–0.45 mm. long. 13
13. Vertex with a row of about 8 short setae between the eyes, some of which stand at the margin. About 12 minute spines on tergite 1. Tergite 2 with a marginal row of short setae laterally and short spines in the middle. Surface covered with short spines in the middle and short setae at the sides. Numerous short spines on the surface of tergites 3 and 4. Basal arc broadly triangular with rounded anterior process. Aedeagus rod 0.33 mm. long. Phallobase with long hook and 6 setae at the base (Fig. 849). *C. solomonarum* (p. 474)  
Only 2 setae at the anterior dorsal margin of the head, vertex bare. The marginal row of tergite 2 consists of short setae of uniform length. 14
14. About 10 rather long spines on tergite 1. Basal arc narrowly triangular, with pointed anterior process. Aedeagus rod 0.33 mm. long. Apical hook of phallobase long (Figs. 845, 846, 848).  
*C. tenuis* (p. 471)  
10–15 minute spines on tergite 1. Basal arc very broad basally with rounded shoulders. Aedeagus rod 0.45 mm. long. Phallobase with short pointed apical process (Fig. 850). *C. (?) inflatipes* (p. 473)
15. Small species (2.5–3 mm.). Labella of labium as long as the theca or slightly longer or shorter. Claspers not fused at the base. 16  
Larger species (3.5–5 mm.). Labella of labium nearly twice as long as the theca. Claspers fused at the base, with triangular end which bears a row of long setae laterally. Aedeagus wholly sclerotized, curved, tapering to a point. 19
16. 4 setae at the anterior dorsal margin of the head. Tergite 5 and sternite 5 not longer than 4. Claspers rudimentary, one-quarter the length of the anal segment (Figs. 877–880).  
*C. (L.) brachythrinx* (p. 482)  
2 setae at the anterior dorsal margin of the head. Tergite and sternite 5 markedly longer than 4. Claspers long and slender. 17
17. Claspers with a row of thick spines on the ventral surface near the tip. Anal segment 2–3 times as long as thick at the base. Aedeagus broad, membranous with 2 lateral sclerotized arms which bear teeth ventrally near the end (Figs. 862–864, 868–876). *C. (L.) ferrarii* (p. 477)  
Claspers without such a row of spines near the tip. Anal segment shorter. Aedeagus of different form. 18
18. Aedeagus wholly sclerotized, curved, tapering to a rounded tip and with a ventral tooth. Tergite 6 with a marginal row of setae and bare on the surface. Philippines (Figs. 897, 898).  
*C. (L.) simulans* (p. 493)  
Aedeagus sclerotized ventrally in 2 ridges and dorsally, membranous at the sides. Tergite 6 without marginal row of setae and covered with minute spines on the surface. Malaya (Figs. 886–890). *C. (L.) obliqua* (p. 488)



19. Length 4.5–5 mm. Anal segment 3–4 times as long as wide at the base. 7–8 minute spines of about equal length on tergite 1. Tergite 6 with 16 marginal setae. Claspers parallel-sided in the basal two-thirds. Basal seta of the apical row at the apical quarter of the clasper. Setae long, with blunt ends (Figs. 881–883). **C. (L.) macrura** (p. 485)

Length 3.5 mm. Anal segment shorter, only 2–3 times as long as wide at the base. The posterior spines of the group on tergite 1 much longer than the anterior ones. Tergite 6 with 12 marginal setae. Claspers widening gradually towards the tip. The basal seta of the apical row at the apical third of the clasper. Setae shorter, with truncated ends (Figs. 893, 894).

**C. (L.) orthotricha** (p. 492)

## FEMALES

1. No sclerites on abdomen between tergite 1 + 2 and anal segment and between sternite 1 + 2 and genital plate. (Subgenus **Cyclopodia**) **2**  
Tergite 6 and sternites 5–7 or 6–7 bearing sclerites. Sternite 7 not transformed into genital plate. (Subgenus **Leptocyclopodia**) **19**
2. Haltere groove completely closed by cover. Large species. Oriental and Pacific Region (Fig. 781). (sykesii group) **3**  
Haltere groove partly closed or open (Figs. 782, 783). **13**
3. Dorsum of abdomen covered with small spines on sclerotized bases only, without any groups of long setae or a field of large spines. **4**  
Groups of long setae and of large spines on the dorsum of the abdomen. **5**
4. Some setae at the anterior dorsal margin of the head and 25–30 short setae on the anterior half of the vertex. Pleurae covered with minute spines. No longer setae on pleurae or venter. Genital plate broader than long, with about 10 spines at the posterior margin in each half and a broad membranous area between the lateral sclerites which bear small spines. Cover of the haltere groove attached in its posterior part only (Fig. 816). **C. oxycephala** (p. 457)  
Some longer setae on the anterior part of the pleurae and a transverse row of longer setae, which is interrupted in the middle, on the venter. Head with setae only at the anterior dorsal margin and on the posterior half of the vertex. Haltere groove cover attached along its whole length. Genital plate rectangular, with about 6 spines at the hind margin in each half (Figs. 811, 812, 814, 815). **C. minor** (p. 455)
5. Notopleural setae absent. Only 8–10 hairs on the vertex between the eyes. No group of large spines in the middle of the dorsum of the abdomen. 2 groups of 9–11 long setae each in the lateral posterior corners of the dorsum. **C. australis** (p. 450)  
Notopleural setae present. **6**
6. A single group consisting of long setae only, or consisting of long setae and spines, on the dorsum of the abdomen. **7**  
A group of large spines on a bare area in the anterior part of the dorsum and one or more groups of long setae on the posterior part of the dorsum. **9**
7. A single group of 20–30 long setae in transverse rows of 3–6 on the dorsum. In some specimens a few large spines in the anterior rows of the group, but no separate group of spines on a bare area. About 12–15 rows of minute spines anterior to the group of setae and 3–4 rows behind it (Figs. 808, 810). **C. inclita** (p. 453)  
A smaller number of long setae in the dorsal group. **8**
8. The dorsal group is oblong and consists of 5–6 very long and strong spines anteriorly and 8–10 long setae posteriorly (Fig. 817). **C. ponapensis** (p. 458)  
The dorsal group consists of 10–15 setae only and is situated near the posterior border of the spinose area. There are about 20 rows of minute spines in front of it and 3–4 behind it (Fig. 805). **C. bougainvillensis** (p. 450)



9. The anterior group of spines is ill-defined and consists of 1–4 spines which are not much larger than some of the surrounding small spines. The group is not always in a bare area and is absent in some specimens (see no. 8). A group of 10–15 long setae near the posterior margin of the spinose area (Fig. 805). *C. bougainvillensis* (p. 450)  
The anterior group consists of 2–6 large spines on a bare area. 10
10. A single, large group of long setae in the posterior part of the dorsum. No minute spines behind this group. Genital plate H-shaped. 11  
2 or 3 groups of long setae behind the anterior group of large spines. Genital plate without median bridge. 12
11. About 6 rows of very long setae in the posterior third of the dorsum. This group is separated from the anterior group of large spines by several rows of minute spines. Only short spines on the pleurae (Figs. 793, 799, 800). *C. sykesii* (p. 444)  
Only 3–4 rows of long setae in the posterior third of the dorsum. This group extends anteriorly in a median stripe which may or may not reach the anterior field of large spines. A group of longer setae on the pleurae anterior to spiracle 4 (Figs. 806, 807). *C. horsfieldi* (p. 452)
12. 2 groups of long setae, each consisting of 2–7 setae, at the lateral posterior corners of the dorsum between spiracles 5 and 6. Only minute spines between these groups and the anterior group of 2–6 large spines. Genital plate square, with a median membranous strip which is narrower in the middle (Figs. 801–803). *C. albertisii* (p. 448)  
3 groups of setae on the dorsum. The 2 groups of long setae at the lateral posterior corners of the dorsum consist of 6–10 setae in most specimens (only 3 in one specimen) and are connected by a row of 4–8 setae in front of the anal segment. (This row is absent in the above specimen with 3 setae laterally.) The anterior field of large spines continues posteriorly in a group of 7–10 long setae which, however, is separated from the posterior groups by a broad area of minute spines (Figs. 818, 819). *C. similis* (p. 449)
13. Haltere groove partly closed by a flap which is attached to the notopleural suture along its whole length and a lateral, rounded bulge opposite. Eyes small. 14  
Haltere groove open. 15
14. Vertex bare. Abdomen very broad, trapezoidal in dorsal view. Dorsum covered with spines anteriorly and setae posteriorly. Genital plate square, wholly sclerotized, with a long, curved horn at its base (Figs. 821–823). *C. pambertoni* (p. 460)  
About 10 setae at the anterior dorsal margin of the head. A crescent-shaped group of about 50 long setae in the middle of the dorsum. In some specimens the median setae may be replaced by very long and strong spines. A row of about 8 long setae in front of the anal segment. Genital plate shield shaped and covered with short spines (Figs. 824, 825, 829–832). *C. macracantha* (p. 462)
15. Large species (3.5–5 mm.). Ethiopian Region and Madagascar. Some long setae on the abdomen. (greeffi group) 16  
Small species (2–3 mm.). Oriental and Pacific Region. No long setae on the abdomen. (tenuis group) 17
16. Anterior dorsal margin of the head bare. Dorsum of abdomen plane, covered with short spines which are minute in a broad median strip and longer laterally and posteriorly in 2–3 rows. 2 groups of long setae, each consisting of 2 rows at the posterior border of the pleurae. Genital plate very small, triangular, with 6–8 spines which are longer than the plate. Madagascar (Figs. 839, 840). *C. dubia* (p. 469)  
2 setae at the anterior dorsal margin of the head. Dorsum of abdomen forming a pronounced angle. Posterior part of dorsum covered with a dense group of 70–80 very long setae. Anterior part of dorsum covered with short and long spines. Genital plate with a curved row of about 12 spines in each half of the posterior margin. Surface of the genital plate covered with about 100 short spines, some of them on isolated sclerotized bases. Ethiopian Region (Figs. 53, 780, 835, 836). *C. greeffi* (p. 465)  
As above but only 35–50 long setae on the posterior part of the dorsum and only about 65 spines on the surface of the genital plate. Arabia. *C. greeffi arabica* (p. 469)

17. 5-8 short setae at the anterior dorsal margin of the head and between the eyes. Tergite 1 + 2 with a marginal row of 2 longer setae laterally and very short spines in the middle. Posterior part of the surface covered with 5-6 rows of short spines which are longer laterally.  
**C. solomonarum** (p. 474)
- Only 2 setae at the anterior dorsal margin of the head. Marginal row of tergite 1 + 2 with longer setae. Only 1-2 rows of short spines on the surface near the marginal row. **18**
18. The marginal row of tergite 1 + 2 consists of setae which are longer laterally and shorter and more closely standing in the middle. Posterior row of tergite 6 with some equally spaced, moderately long setae in the middle, in front of the anal segment (Fig. 847). **C. tenuis** (p. 471)
- The marginal row of tergite 1 + 2 consists of equally spaced setae which are not much shorter in the middle. Posterior row of tergite 6 with 4 long setae in the middle with a space between the 2 median setae (Figs. 852, 853). **C. (?) inflatipes** (p. 473)
19. Small species (2.5 mm.). Dorsum of abdomen covered with short spines in most species. Sternites 5-7 with sclerites. **20**
- Larger species (3-4 mm.). Several rows of long setae on the dorsum of the abdomen. Sternites 6 and 7 bearing sclerites. **21**
20. Tergite 1 + 2 nearly triangular, with a marginal row of 16-20 setae. Surface bare except for a premarginal row of 4-5 short spines. Sclerites on sternites 5 and 6 standing at right angles, or nearly so, to the median line. Anal sclerite strip-like, with 2 setae at the end (Figs. 865, 866). **C. (L.) ferrarii** (p. 477)
- Tergite 1 + 2 elliptical, with a marginal row of 27 setae. A group of about 20 short spines in the middle of the posterior part of the surface. Sclerites on sternites 5 and 6 standing obliquely, at an angle of about 45° to the median line. Anal sclerite elliptical with about 6 short setae (Figs. 891, 892). **C. (L.) obliqua** (p. 488)
21. Larger species (3.5-4 mm.). 3 groups of long setae, each divided into lateral halves and consisting of 1-3 rows, on the dorsum of the abdomen. The lateral setae of the posterior groups are very long and curved towards the anal segment. A row of short setae anterior to the sclerites on sternite 6. Sternite 7 with a double marginal row of long setae (Figs. 884, 885). **C. (L.) macrura** (p. 485)
- Smaller species (3-3.5 mm.). The 2 anterior groups of setae on the dorsum consist of single rows of moderately long setae. The posterior groups consist of a single row on the dorsum and of double rows on the pleurae. All setae are straight and not curved against the anal segment. The row of short setae anterior to the sclerites on sternite 6 is absent. Sternite 7 with a marginal row which is single in the middle and double laterally (Figs. 895, 896). **C. (L.) orthotricha** (p. 492)

The females of *Cyclopodia truncata*, *C. simulans* and *C. brachythrinx* are unknown.

#### SUBGENUS CYCLOPODIA Kolenati, 1863

*Diagnosis.* Palps laterally compressed, broad, with short terminal setae. Sclerite connecting the thoracic ctenidium with coxa 2 more or less narrowly triangular and covered with several rows of setae. Tergites of the male abdomen with either continuous or interrupted marginal rows of setae or short spines. Tergites 5 and 6 always much shorter than the preceding tergites. Anal segment of the male broadly conical, less than twice as long as wide at the base. A row of short thick spines at the hind margin of sternite 5 of the male. *Male genitalia*—aedeagus membranous, without apodeme, completely invaginated inside the abdomen in the resting position. There is a connecting tube which bears a field of spines. Segmentation of the abdomen of the female much reduced. No sclerites between the basal sclerites and the anal segment, except sternite 7



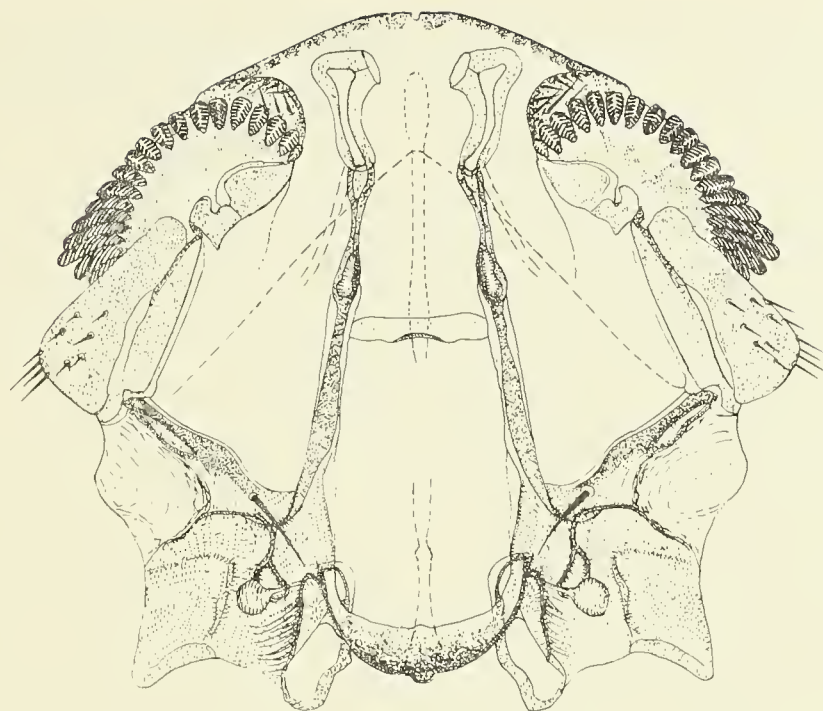
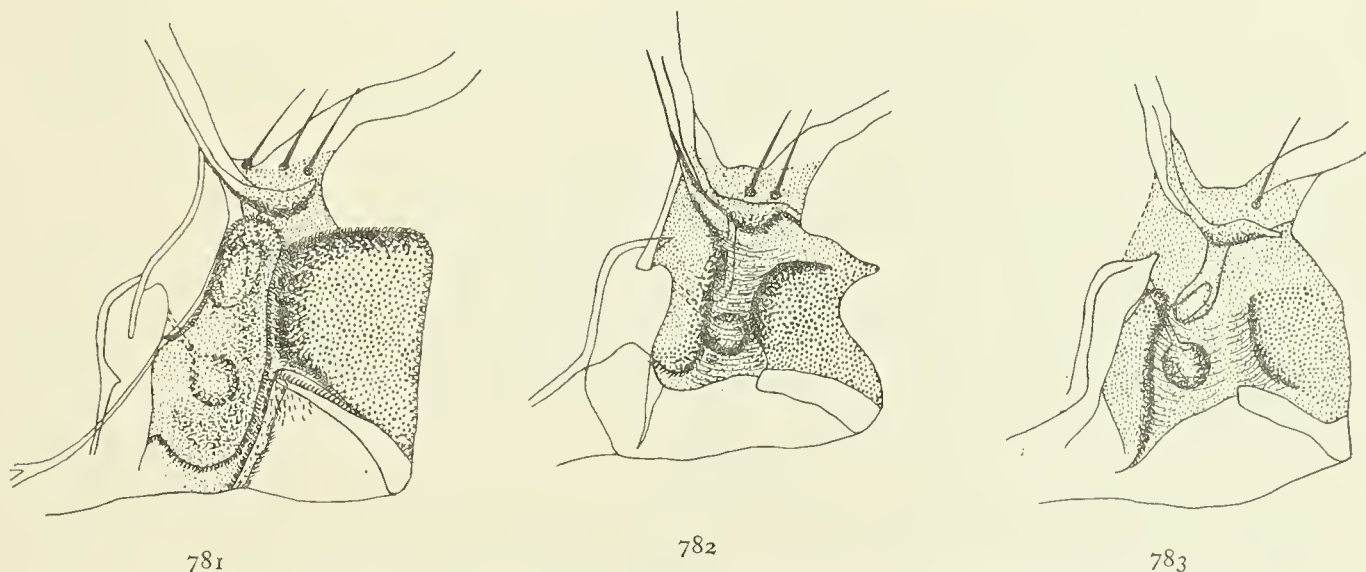


Fig. 780. *Cyclopodia greeffi* Karsch. Thorax, dorsal.

which is transformed into a genital plate with spines at the posterior margin. Anal sclerite absent.

The subgenus is divided into the 4 following groups:

(1) *sykesii* group. 10 species. Oriental and Pacific Region. Size 4–5.5 mm. Eyes large. Setae on anterior dorsal margin of head and on the vertex present. Haltere groove completely closed by a cover which is attached only in its posterior part on the median side (Fig. 781). Tergites of the male abdomen with marginal rows of setae which are broadly interrupted in the middle. (*C. australis*, which belongs to this group according to all other characters, has a different arrange-



Figs. 781–783. Haltere groove of: 781. *Cyclopodia sykesii*; 782. *C. pembertoni*; 783. *C. greeffi*.



ment of the marginal rows. There are only short spines on tergites 2 and 3, a group of setae in the middle on tergite 4 and continuous rows on tergites 5 and 6.) Spines on sternite 5 club-shaped. Spiracles of female abdomen large (80–100 $\mu$ ) (Fig. 793). Genital plate with thick spines posteriorly.

(2) *pembertoni* group. 2 species. Pacific Region. Size 3.5–4 mm. Eyes small. Tergites of male abdomen with continuous marginal rows. Spines on sternite 5 club-shaped. Haltere groove partly closed by a narrow flap which is attached along its whole length and by a large rounded bulge opposite (Fig. 782). Spiracles of female abdomen small (50 $\mu$ ). Vertex either as in *sykesii* group or bare. Genital plate with thick spines posteriorly.

One species (*C. minor*) is intermediate between the *sykesii* and *pembertoni* groups. The eyes are large as in the *sykesii* group. The arrangement of setae on the head differs from that of both groups in having only 2 setae at the anterior margin and some setae on the posterior part of the vertex. The cover of the haltere groove resembles that of the *pembertoni* group in its being attached to the notopleural suture along its whole length, but it is larger, covering the groove nearly completely. The marginal rows of the tergites of the male abdomen are interrupted on tergites 2 and 3 and continuous on tergites 4 to 6.

(3) *greeffi* group. 2 species. Ethiopian Region and Madagascar. Size 4–5 mm. Eyes large. Vertex bare, anterior margin of head with 2 setae or bare. Haltere groove open (Fig. 783). Tergites of male abdomen with continuous marginal rows. Spines on sternite 5 not club-shaped. Spiracles of female abdomen small (50 $\mu$ ) (Fig. 794). Genital plate with thick spines posteriorly.

(4) *tenuis* group. 4 species. Oriental and Pacific Region. Size 2–3 mm. Vertex bare. A few setae at the anterior margin of the head. Haltere groove open. Tergites of the male abdomen with continuous marginal rows. Spines on sternite 5 club-shaped. Abdomen of female without any groups of long setae. Spiracles of female abdomen small (30 $\mu$ ). Genital plate with thin spines posteriorly.

### SYKESII GROUP

#### *Cyclopodia sykesii* (Westwood, 1835)

(Figs. 12–17, 21, 57, 781, 784, 793, 795–800)

*Nycteribia sykesii*. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275.

*Nycteribia hopei*. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275. ('Forsan sequentis mas'.)

*Nycteribia sykesii* Westwood. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Nycteribia hopei* Westwood. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.

*Cyclopodia sykesii* (Westwood). Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

*Cyclopodia hopei* (Westwood). Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.

*Cyclopodia sykesii* (Westwood). Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia hopei* (Westwood). Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia sykesii* (Westwood). Scott, 1907, *Trans. Ent. Soc. Lond.* p. 421.

*Cyclopodia sykesii* (Westwood). Scott, 1914, *Ann. Mag. Nat. Hist.* (8) **14**, 209.

*Cyclopodia sykesii* (Westwood). Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Cyclopodia sykesii* (Westwood). Falcoz, 1924, *Bull. Mus. Hist. Nat. Paris*, **30**, 223. (Record from 'Judée' error in labelling.)

*Cyclopodia sykesii* (Westwood). Phillips, 1924, *Spol. Zeyl.* **13**, 65.

*Cyclopodia sykesii* (Westwood). Jobling, 1928, *Parasitology*, **20**, 254. (Structure of head.)

*Cyclopodia hopei* (Westwood). Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31.

*Cyclopodia sykesii* (Westwood). Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117.

*Cyclopodia sykesii* (Westwood). Mukerji & Dasgupta, 1954, *Proc. Zool. Soc. Bengal*, **7**, 1.

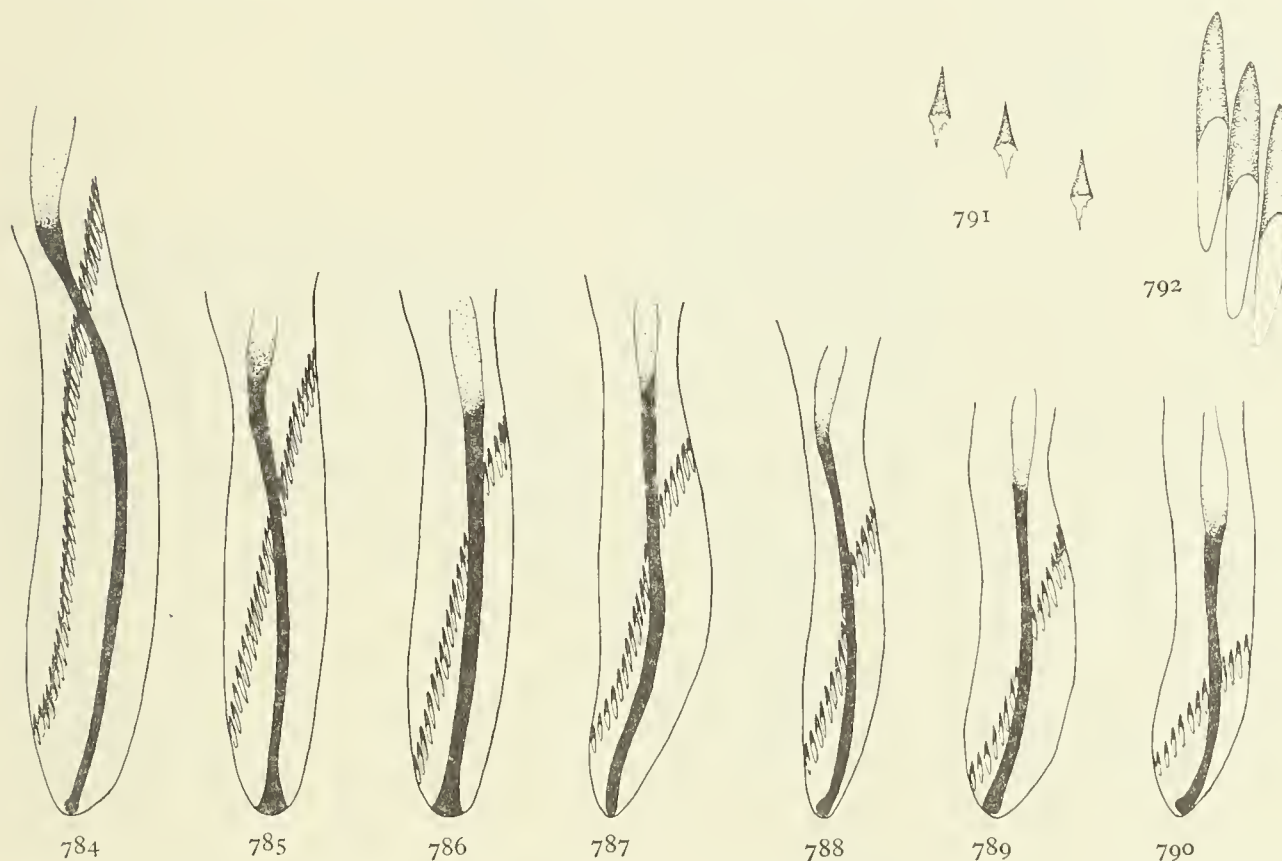
*Cyclopodia sykesii* (Westwood). Hiregaudar & Bal, 1956, *Agra Univ. Jour. Res. (Science)*, **5**, 1.

*Cyclopodia sykesii* (Westwood). Theodor, 1959, *Parasitology*, **49**, 242.

Length 4–5 mm. Colour brown.

*Head*. Vertex covered with short setae. A row of 6–8 setae at the anterior dorsal margin of the head with a gap in the middle. Eyes with deeply separated lenses. Labella of the proboscis 1.5 times the length of the theca.

*Thorax*. Median sternal suture indistinct in the middle. Oblique sutures convex anteriorly,

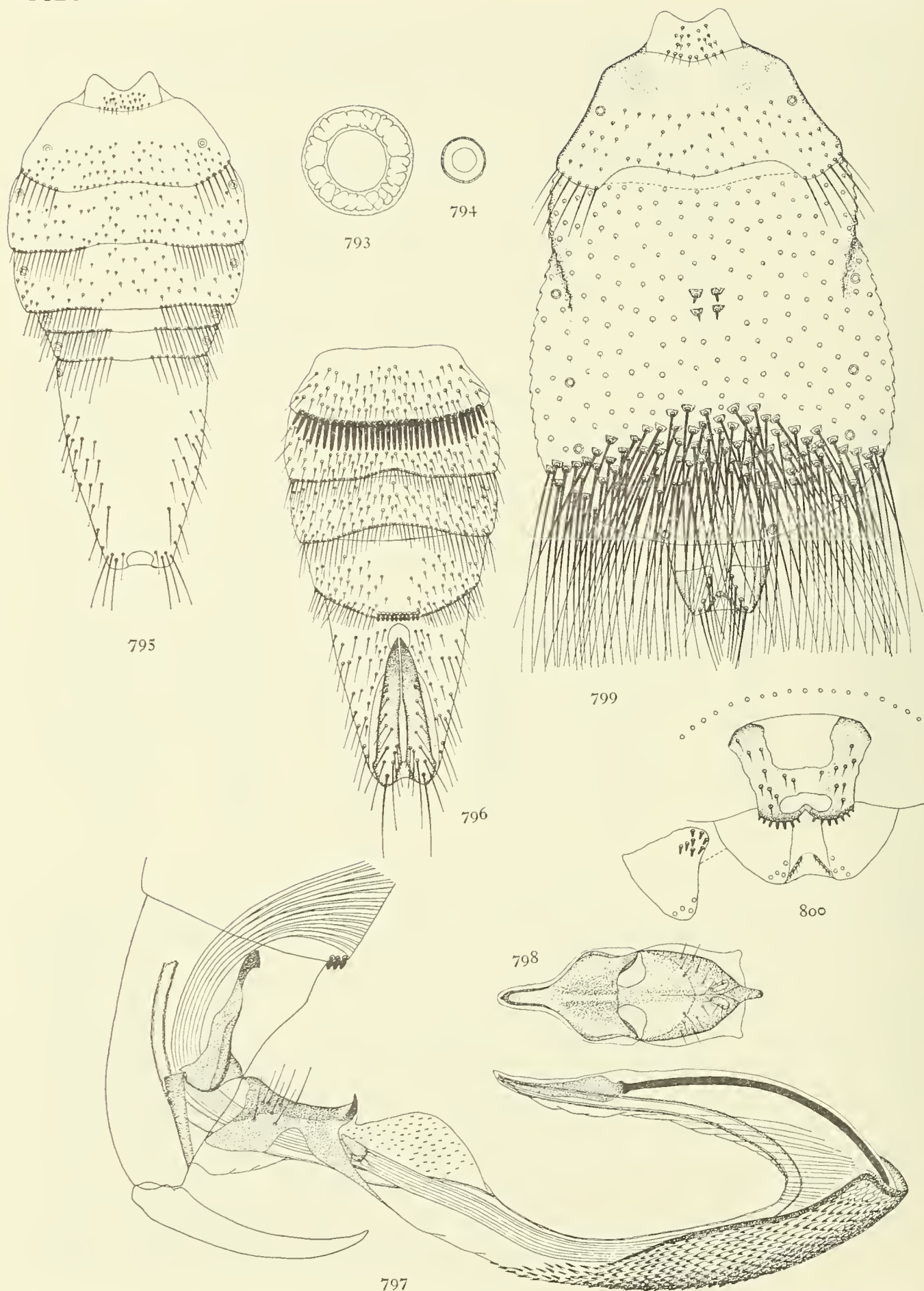


Figs. 784–792. Genitalia of species of the *sykesii* group (semi-diagrammatic). The rod of the aedeagus, the distal border of the area of spines of the connecting membrane and the outline of the invaginated connecting membrane only are shown. 784. *C. sykesii*; 785. *C. albertisii*; 786. *C. similis*; 787. *C. oxycephala*; 788. *C. bougainvillensis*; 789. *C. ponapensis*; 790. *C. inclita*; 791. spines of the connecting membrane of *C. australis*; 792. same of other species of the *sykesii* group.

forming an angle of about 90°. A row of moderately long setae at the sides of the posterior margin of the sternal plate. Thoracic ctenidia with about 15 thick, blunt, curved spines. Mesopleural sutures slightly curved, with 3 notopleural setae near the base. Haltere groove closed by a triangular cover attached in its posterior median part. Legs long, tibiae cylindrical, slightly compressed laterally, with 3 rings of weaker integument in the middle. A few moderately long setae near the rings.

*Male abdomen*. Tergite 1 + 2 rounded posteriorly, with a row of 5–6 moderately long setae at the lateral posterior corners. Posterior part of the surface covered with short spines. A group of 25–30 small spines on the membranous area at the base of the sclerite which represents





Figs. 793–800. 793. *Cyclopodia sykesii* (Westwood). abdominal spiracle; 794. same of *C. greeffi*; 795. *C. sykesii*. male abdomen, dorsal; 796. same, ventral; 797. male genitalia extended; 798. basal arc and phallobase, dorsal; 799. female abdomen, dorsal; 800. genital plate.



tergite 1. Tergites 3 and 4 with marginal rows of moderately long setae in the lateral thirds. Surface with small spines. Tergites 5 and 6 shorter than 4, bare on the surface, with marginal rows of longer setae and a narrower gap in the middle. Anal segment broadly conical, with moderately long setae in the lateral parts of the surface and long setae posteriorly. Sternite 1 + 2 short, with a ctenidium of 32 blunt, broad spines. Sternites 3 and 4 with dense marginal rows of setae which are longer laterally. Sternite 5 longer, with convex posterior margin which bears a row of about 10 short, club-shaped spines in the middle and setae lateral to them.

*Genitalia.* Claspers straight, tapering to a dark point, 5–6 times as long as thick at the base. They bear long setae near the base and short setae up to the middle of the dorsal surface. Basal arc with broad, rounded anterior process, rounded shoulders and concave posterior margin. Phallobase triangular, with a long apical hook and about 12 setae across the middle. Parameres small, elliptical. The rod of the aedeagus with a leaf-shaped apical part, 1.3–1.5 mm. long without the apical part. The area of spines of the connecting tube covers its whole ventral surface and is as long as the aedeagus rod.

*Female abdomen.* Ovoid in distended specimens. Spiracles large, 80–90  $\mu$ . Tergite 1 + 2 with 5–8 setae at the posterior lateral corners which are longer than in the male. Connexivum between tergite 1 + 2 and the anal segment covered with minute spines in its anterior two-thirds; in the middle of this area a group of 4 large spines forming a square on a bare area, sometimes 2–3, or 5–6. The posterior third of the dorsum covered with about 6 rows of very long and strong setae. The area behind the setae is bare. Tergite 6 absent. Anal segment short, conical, with long setae posteriorly. Sternite 1 + 2 as in the male but longer. Ventral surface of the abdomen covered with short spines. The last row of the spinose area contains 10 long setae in the middle opposite sternite 7 (genital plate). Sternite 7 H-shaped, with 6–8 short spines at each of the posterior broadened ends of the H. 2 groups of 8–10 spines at the interior ventral corners of the anal segment which are covered by sternite 7 in general.

Distribution and hosts: India, Ceylon, Maldives Islands, Burma south to Rangoon, mainly on *Pteropus giganteus*. The record from Judaea is due to an error in labelling (Map 4).

## MATERIAL IN THE COLLECTION

## CHINA

- 1 ♂, G. T. Lay (Brit. Mus. 40.1.10, 42). No recent records from China. This specimen is referred to as *Nycteribia jenynsii* (?) by Walker in List of Diptera, IV, 1148.

## INDIA

- From *Pteropus giganteus*, 1 ♀ (Brit. Mus. 1911.103).  
Calcutta, from *Pteropus giganteus*, 10.xii. 1911, P. H. Dodsworth, N. C. Rothschild, 2 ♂.  
Karimnagar, Hyderabad, E. Horsnail, N. C. Rothschild, 2 ♀.  
Poona, from fruit bat no. 4, Dec. 1917, Ph. Gorse, 8 ♂ 2 ♀ (Brit. Mus. 1919.135).  
Balugaon, Puri, Orissa, from *Pteropus* sp., 23.vii. 1913, N. Annandale, ex coll. Indian Museum, N. C. Rothschild, 2 ♂ 2 ♀.

## CEYLON

- Barberyn Islands, West coast, from *Pteropus giganteus*, 23.xi. 1907, T. Bainbridge Fletcher, 24 ♂ 16 ♀ (Brit. Mus. 1908.48).  
From *Pteropus giganteus*, Sept. 1909, R. C. Purnett, 3 ♂ 3 ♀.  
From *Pteropus giganteus*, Aug. 1911, J. C. F. Fryer, 2 ♂ 2 ♀.  
Cheddikulam, from flying fox, 15.ii. 1913, E. W. Major, N. C. Rothschild, 4 ♂ 4 ♀.  
Peradeniya, from flying fox, 15.ii. 1914, E. W. Major, N. C. Rothschild, 6 ♂ 3 ♀.  
Anasigalla, Matugama, Kalutara, from *Pteropus giganteus*, 2.i. 1922, W. W. A. Phillips, 4 ♂.  
St George, Matugama, Kalutara, from *Pteropus giganteus*, 27.ii. 1923, W. W. A. Phillips, 8 ♂ 2 ♀.  
Gonagama, Kitulgala, from *Pteropus giganteus*, 25.ix. 1925, W. W. A. Phillips, 2 ♂ 1 ♀.

## CYCLOPODIINAE

## CYCLOPODIA

Tonacombe, Namunukula, Uva hills, from *Pteropus giganteus*, 17.ix. 1952, W. W. A. Phillips, 1 ♂.

## BURMA

Rangoon, Aug. 1926, Ripley, H. H. Marshall, 1 ♂ 2 ♀.

Rangoon, from *Pteropus giganteus*, 18.i. 1917, H. H. Marshall, 1 ♂ 1 ♀.

Prome, from *Pteropus* sp., 23.ix. 1937, G. Heinrich, Burma Expedition, 15 ♂ 5 ♀ (Brit. Mus. 1946.288). Same data, from *Tupaia*, 1 ♀ (straggler).

## HOST SYNONYMY

## Name on original label

*Pteropus edwardsi* Geoffroy.

*Pteropus medius* Temminck.

## Current name

*Pteropus giganteus* Bruennich.

*Pteropus giganteus* Bruennich.

**Cyclopodia albertisii** Rondani, 1878

(Figs. 785, 801-803)

*Cyclopodia albertisii*. Rondani, 1878, *Ann. Mus. Civ. Stor. Nat.* **12**, 150.

*Cyclopodia albertisii* Rondani. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Nycteribia pteropus*. Rainbow, 1904, *Rec. Austr. Mus.* **5**, 78.

*Cyclopodia pteropus* Rainbow. Ferris, 1924, *Amer. Mus. Nov.* **110**, 5.

*Cyclopodia albertisii* Rondani. Scott, 1932, *Stylops*, **1**, 25.

*Cyclopodia albertisii* Rondani. Theodor, 1959, *Parasitology*, **49**, 242.

Length 4-5 mm. Specimens from the Kei Islands, 5-6 mm. Colour reddish brown to dark brown. Head with 25-30 setae on the anterior part of the vertex, not counting those on the anterior margin. Thorax and legs as in *C. sykesii*.

*Male abdomen*. As in *C. sykesii* in general. Only 12-20 minute spines on tergite 1.

*Genitalia*. Phallobase with a broad, short hook. Rod of the aedeagus 0.75-0.8 mm. long, 0.9 in the specimens from the Kei Islands. The area of spines on the connecting membrane as long as the rod of the aedeagus.

*Female abdomen*. Tergite 1 + 2 as in *C. sykesii*, but only 12-20 minute spines on tergite 1 and 3-5 setae at the lateral posterior corners. Dorsum of the abdomen covered with minute spines and a group of 4 large spines in the middle on a bare area, only 1-2 or 5-7 in some specimens. Specimens from the Palau Islands have constantly less spines in this group (2.6 mean as against 4.1 in Australian specimens) and may eventually have to be considered as a separate subspecies. 2 groups of long setae at the lateral posterior corners of the abdomen. These groups consist of 6-7 setae in some specimens and of only 2-3 in others. Abdominal ctenidium with 36 spines. A row of about 10 long setae opposite sternite 7. Sternite 7 square, consisting of 2 lateral sclerites with rounded posterior margin which bears about 8 short spines.

Distribution and hosts: Moluccas (type locality), New Guinea, Kei and Salawati Islands, north and east Australia, from *Pteropus gouldii*, *P. conspicillatus*, *P. poliocephalus*. Palau Islands, from *Pteropus pelewensis*.

## MATERIAL IN THE COLLECTION

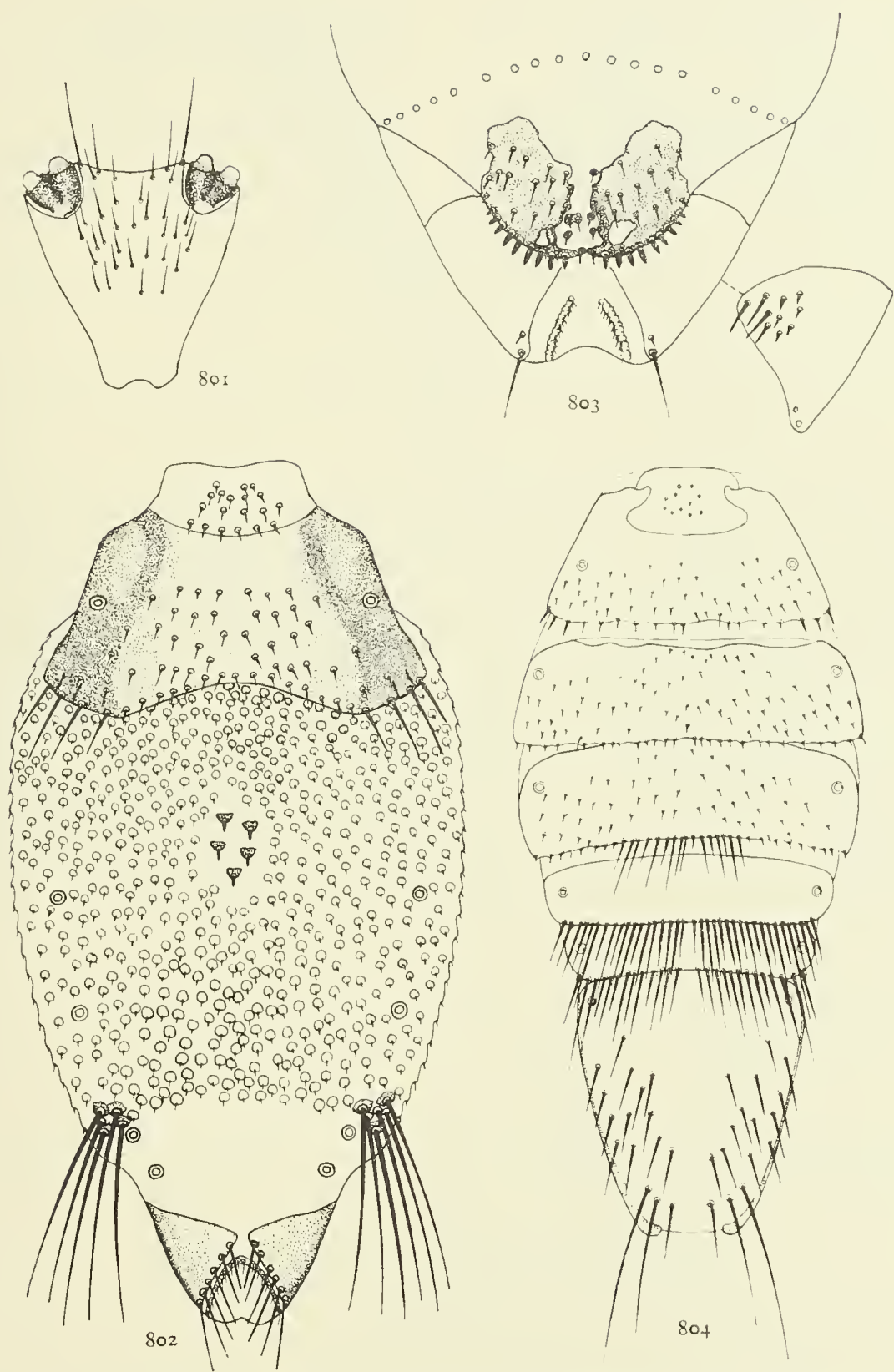
## AUSTRALIA

Mossman, Queensland, from *Pteropus* sp., F. Muir, 1 ♂ 1 ♀.

Cairns, N.E. Queensland, from small, long-tailed, dark grey bat, Nov. 1902, W. Y. H. Rosenberg, N. C. Rothschild, 3 ♂ 3 ♀.

North Barnard group, South of Cairns, Queensland, from *Pteropus conspicillatus*, W. E. J. Paradise, 1 ♂ 1 ♀.

Olive River, York Peninsula, from *Pteropus gouldii*, 12.viii. 1923, G. H. Wilkins, W.A.I. Expedition, 4 ♂ 3 ♀ (Brit. Mus. 1923.412).



Figs. 801-804. *Cyclopodia* spp. *C. albertisii* Rondani. 801. head, dorsal; 802. female abdomen, dorsal; 803. genital plate; *C. australis* Theodor. 804. male abdomen, dorsal.



## CYCLOPODIINAE

## CYCLOPODIA

Mary River, near Darwin, North Territory, 17.xi. 1902, J. T. Tunney, N. C. Rothschild, 3 ♂ 3 ♀.  
Botanical Garden, Sydney, from *Pteropus poliocephalus*, 3.iv. 1920, A. Musgrave, 1 ♂.

## NEW GUINEA

Port Moresby, from white-necked fruit bat, Apr. 1910, F. Muir, no. 470, 4 ♂ 2 ♀.

## KEI ISLANDS

From *Pteropus melanopogon*, 1882, Challenger Expedition, 1 ♂ 1 ♀ (Brit. Mus. 1911.103).  
Kei Tual, from flying fox, 5.i. 1930, M. von Kueh-lewein, 3 ♂ 4 ♀ (Brit. Mus. 1931.191).

## SALAWATI ISLANDS

Samate, from flying fox, 15.i. 1930, M. von Kueh-lewein, 3 ♂ 2 ♀ (Brit. Mus. 1931.191).

**Cyclopodia australis** Theodor, 1959

(Figs. 791, 804)

*Cyclopodia australis*. Theodor, 1959, *Parasitology*, **49**, 242.

Resembling *C. albertisii* in general, differing as follows:

*Head*. Only 8–10 short setae on the vertex between the eyes, not counting those on the anterior margin.

*Thorax*. Notopleural setae absent (one small seta on one side in one specimen).

*Male abdomen*. The marginal rows of tergites 2 and 3 consist of very short spines like those on the surface of the tergites. There are no long setae in the marginal rows. Tergite 4 with a marginal row of moderately long setae in the middle and short setae laterally. Tergites 5 and 6 with continuous marginal rows of moderately long setae. Tergites 2–4 covered with short spines on the surface, tergites 5 and 6 bare. Tergites 5 and 6 of about equal length. Sternite 5 with a row of 12–15 club-shaped spines at the posterior margin.

*Genitalia*. The connecting tube of the aedeagus is wholly covered with short, triangular spines. Rod of the aedeagus thick and tapering to a fine point, 0.9 mm. long.

*Female abdomen*. The anterior group of large spines on the dorsum is absent in the single female examined. The lateral groups of long setae consist of 9–11 setae which are more widely spaced than in *C. albertisii*. Sternite 7 square, with an indistinct median membranous strip. Ventral surface of the anal segment completely covered with short spines.

## MATERIAL IN THE COLLECTION

## AUSTRALIA

Darwin, Northern Territory, 17.ix. 1902, J. T. Tunney, N. C. Rothschild, 2 ♂ 1 ♀ paratypes.  
Mary River, near Darwin, 17.ix. 1902, J. T. Tunney, N. C. Rothschild, 1 ♂ paratype.

## OTHER MATERIAL EXAMINED

## AUSTRALIA

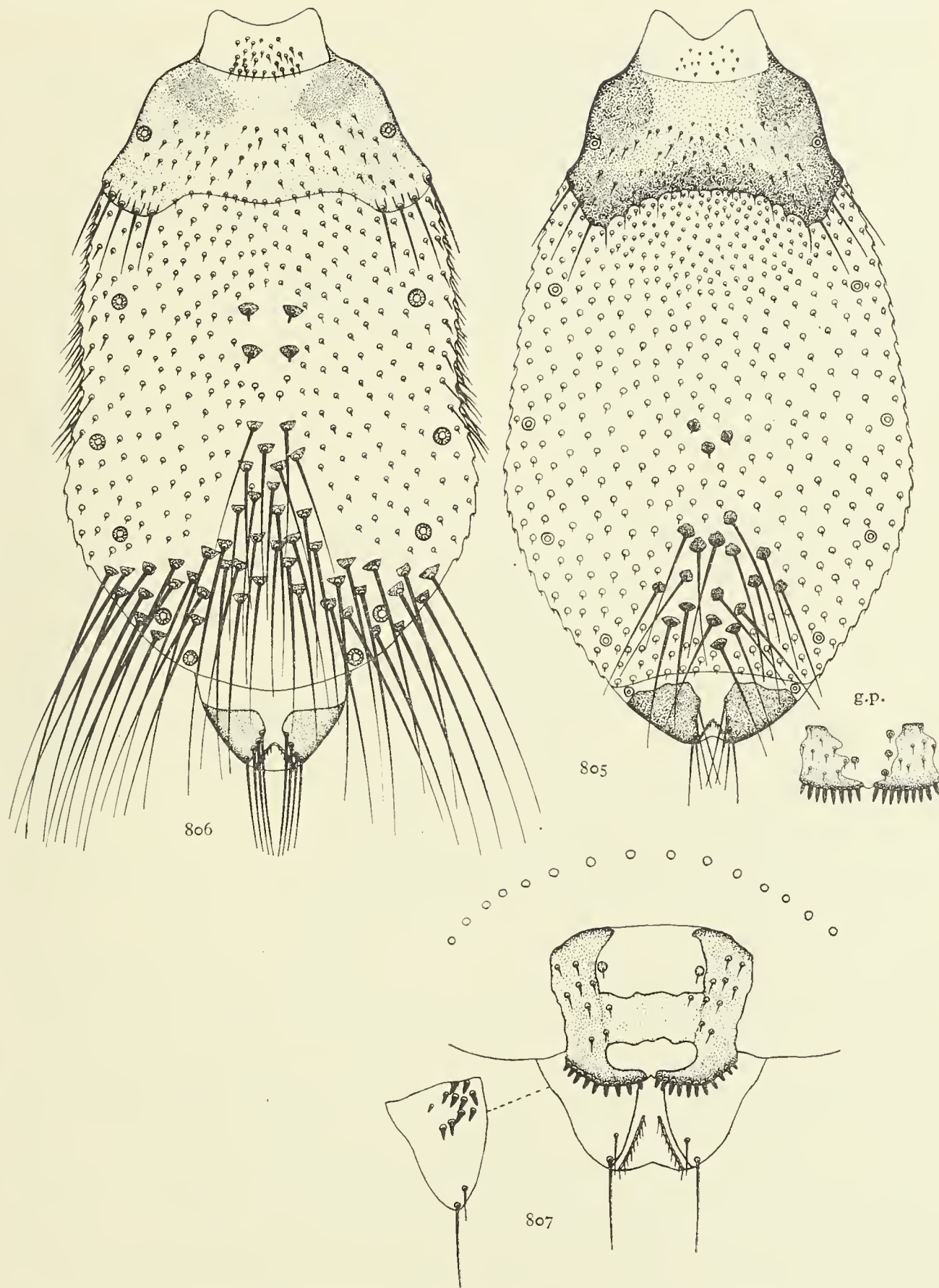
Townsville, Queensland, from *Pteropus gouldii*, 14.ii. 1955, D. J. Lee, ♂ holotype, Department of Parasitology, Hebrew University, Jerusalem.

**Cyclopodia bougainvillensis** Theodor, 1959

(Figs. 788, 805)

*Cyclopodia bougainvillensis*. Theodor, 1959, *Parasitology*, **49**, 242.

Length 4–4.5 mm. Colour brown. Head with 2 long and several shorter setae at the anterior dorsal margin. 20–25 short setae on the vertex, leaving the posterior two-thirds of the vertex bare. Eyes large. Labella of the proboscis as long as the theca.



Figs. 805-807. *Cyclopodia* spp. *C. bougainvillensis* Theodor. Female. 805. abdomen, dorsal, with genital plate; *C. horsfieldi* de Meijere. 806. female abdomen, dorsal; 807. genital plate.

*Thorax and legs.* As in *C. sykesii*. 2–3 notopleural setae.

*Male abdomen.* As in *C. sykesii*.

*Genitalia.* Phallobase with broad apical hook and a deep basal incision. Rod of the aedeagus 0.8 mm. long. Area of spines on the connecting membrane three-quarters of the length of the rod.

*Female abdomen.* Only a single group of long setae on the dorsum. The group consists of only 11–15 setae as against 25–30 in *C. inclita*. The group is placed near the posterior border of the spinose area of the dorsum. Anterior to the group of long setae there is in most specimens a group of 2–3 spines which are larger than the others, but not as large as, for instance, in *C. sykesii*. Genital plate rectangular, with a wide median membranous strip and 8–10 short spines at the posterior margin in each half.

Distribution: New Guinea, Solomon Islands.

Type series in the U.S. National Museum.

#### MATERIAL IN THE COLLECTION

##### SOLOMON ISLANDS

Bougainville, Cape Torokino, from *Pteropus grandis*, 11.x. 1944, Fritts, 1 ♂ paratype.

Guadalcanal, Balesuna, from *Pteropus* sp., 3.v. 1936, R. J. A. Lever, 1 ♀ paratype.

Rennell Island, from *Pteropus tonganus geddiei*, 29.x. 1953, J. D. Bradley, 2 ♂ 2 ♀ (Brit. Mus. 1953.222).

#### OTHER MATERIAL EXAMINED

##### NEW GUINEA

Sudest Island, from *Dobsonia* sp. and *Pteropus* sp.

### *Cyclopodia horsfieldi* de Meijere, 1899

(Figs. 63, 806, 807)

*Cyclopodia horsfieldi*. de Meijere, 1899, *Tijdschr. Entom.* **42**, 153.

*Cyclopodia horsfieldi* de Meijere. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia horsfieldi* de Meijere. Scott, 1917, *Parasitology*, **9**, 593.

*Cyclopodia horsfieldi* de Meijere. Ferris, 1925, *Phil. Jour. Science*, **25**, 413.

? *Cyclopodia magna*. Kishida, 1932, *Icon. Insect. Japon*, Tokyo.

*Cyclopodia horsfieldi* de Meijere. Schuurmans Stekhoven & Hardenberg, 1938, *Capit. Zool.* **8**, 1.

*Cyclopodia horsfieldi* de Meijere. Theodor, 1959, *Parasitology*, **49**, 242.

*Cyclopodia horsfieldi* de Meijere. Theodor, 1963, *Fieldiana Zool.* **42**, 151.

The males of this species resemble *C. sykesii* so closely that males alone cannot be distinguished from *C. sykesii*. The female differs from *C. sykesii* in the chaetotaxy of the abdomen. The group of long setae on the abdomen consists of only 3–4 transverse rows of more widely spaced setae which reach laterally further beyond the spiracles than in *C. sykesii*. This group of setae continues anteriorly in a median strip which reaches the anterior group of large spines in some specimens. In others the anterior area of spines is separated from the posterior group of long setae by a varying number of rows of small spines, so that the specimens resemble *C. sykesii*. Females of *C. horsfieldi* can, however, always be differentiated from *C. sykesii* by the presence of longer setae on the pleurae, anterior and ventral to spiracle 4. The spiracles are even larger than in *C. sykesii*, about 100  $\mu$ . Sternite 7 with about 10 spines in each half of the posterior margin.

Distribution and hosts: throughout the Malaysian Region, including Celebes and the Philippines. Mainly from *Pteropus vampyrus*, more rarely from other species of *Pteropus*. See Map 4.



## MATERIAL IN THE COLLECTION

## THAILAND

Koh Samesan Island, near Cape Liant, from *Pteropus vampyrus*, Oct. 1906, C. Boden Kloss, 6 ♂ 3 ♀ (Brit. Mus. 1917.43).

## MALAYA

Patani, from *Pteropus vampyrus*, 15.vi. 1901, H. C. Robinson & N. Annandale, 1 ♂.  
Jalor, Biserat, from *Pteropus vampyrus*, 12.vii. 1901, H. C. Robinson & N. Annandale, 3 ♂ 3 ♀ (Brit. Mus. 1903.281).  
Alang Tigar Island, Malay Archipelago, from *Pteropus vampyrus*, E. Stresemann, 2 ♀ (Brit. Mus. 1913.504).

## BORNEO

Kuching, from *Pteropus vampyrus*, Mar. 1906, J. Hewitt, 4 ♂ 3 ♀.

## CELEBES

Manado, A. R. Wallace, W. W. Saunders, 1 ♂ (Brit. Mus. 68.4).

Bonerate Island, near Flores, from *Pteropus* sp., N. C. Rothschild, 3 ♂ 2 ♀.

## SUMATRA

Padang, from *Pteropus vampyrus*, 13.vii. 1944, N. C. Miller, 2 ♂ 1 ♀ (Brit. Mus. 1947.22).  
Enggano Island, from *Pteropus hypomelanus*, E. Modigliani, 2 ♂ 3 ♀ (Brit. Mus. 1911.103).

## PHILIPPINES

From *Rousettus amplexicaudatus*, 1911, E. E. Austen, 1 ♂ 1 ♀.  
Panaqui Tag, Occidental Negros, from *Pteropus* sp., 9.xi. 1911, M. B. Mitzmain, 3 ♂ 3 ♀.  
Porto Gallera, Mindoro, from large fruit bat, 1917, J. Bequaert, 2 ♂ 1 ♀.  
Pinungasan, Malobago, Borongan, Samar, from fruit bats no. 14 and 44, 21.vi. 1948, A. P. Castro and P. Anonuevo, 1 ♂ 2 ♀ (Brit. Mus. 1948.554).

## HOST SYNONYMY

Name on original label	Current name
<i>Pteropus edulis</i> Geoffroy.	<i>Pteropus vampyrus</i> L.
<i>Pteropus philippinensis</i> Elera.	<i>Rousettus amplexicaudatus</i> Geoffroy.

**Cyclopodia inclita** Falcoz, 1927

(Figs. 790, 808–810)

*Cyclopodia inclita*. Falcoz, 1927, *Insects of Samoa, VI. Diptera*, fasc. 1, 1.

*Cyclopodia similis*. Speiser, 1901, *Arch. Naturgesch.* 67, 11. (Record from Viti (Fiji) Islands.)

*Cyclopodia similis* Speiser. Ferris, 1916, *Entom. News*, 27, 433.

*Cyclopodia similis* Speiser. Karaman, 1939, *Ann. Mus. Serb. merid.* 1, 31

*Cyclopodia inclita* Falcoz. Theodor, 1959, *Parasitology*, 49, 242.

Length 3.5–4 mm. Colour reddish brown to dark brown.

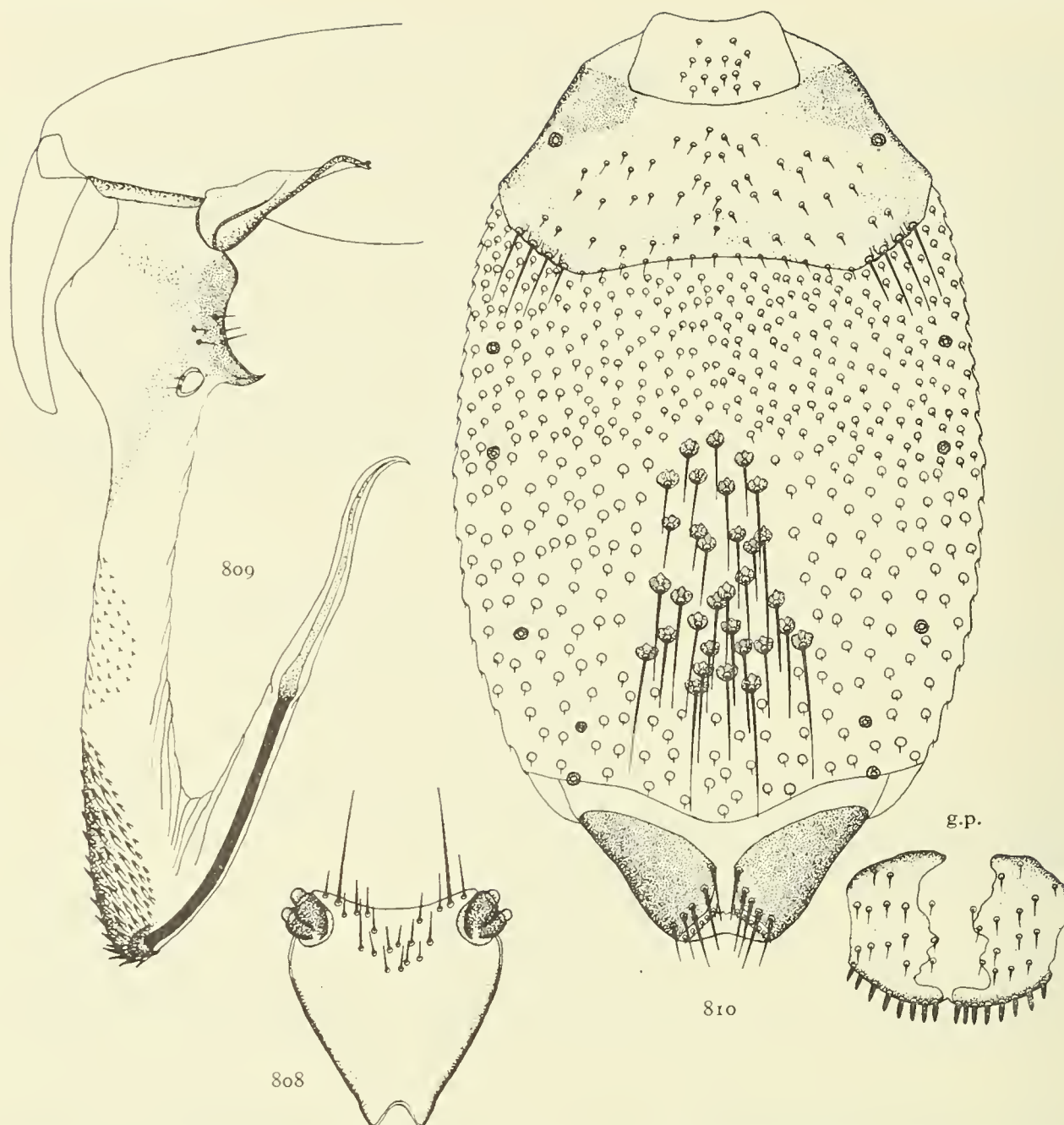
**Head.** Vertex with a triangular group of about 12 short setae between the eyes, bare in the posterior two-thirds. A longer and some short setae on each side of the anterior dorsal margin. Labella of the proboscis as long as the theca.

Thorax and legs as in *C. sykesii*.

**Male abdomen.** As in *C. albertisii*, with short setae at the lateral corners of tergite 2. The marginal setae on tergites 3–6 are shorter than in *C. albertisii* in most specimens. Abdominal ctenidium with 36 spines.

**Genitalia.** The basal bulb of the connecting tube is absent. Instead of the bulb there is a basal ventral widening near the junction of the tube with the abdomen. Rod of the aedeagus very short, 0.6–0.7 mm., with a long, membranous apical prolongation. The area of spines is also very short, covering only about half the length of the rod.

**Female abdomen.** 4–5 short setae at the lateral corners of tergite 2. 10–16 minute spines on tergite 1. An oblong group of 20–30 long, thin setae in transverse rows of 4–6 in the middle of the dorsum. In some specimens a few spines in the anterior rows of the group. Several rows of short spines behind the group of long setae. Sternite 7 (genital plate) rectangular, with a median membranous strip. About 8 short spines at the rounded posterior margin in each half.



Figs. 808–810. *Cyclopodia inclita* Falcoz. 808. head, dorsal; 809. male genitalia, extended; 810. female abdomen, dorsal, with genital plate.

Distribution and hosts: Samoa, from *Pteropus tonganus* and *P. samoensis*. Fiji Islands, from *Pteropus nawaiensis*.

#### MATERIAL IN THE COLLECTION

##### SAMOA

Apia, Upolu, from *Pteropus samoensis*, 16.v. 1924, 3.vii. 1924, P. A. Buxton & G. H. E. Hopkins, 4 ♂ 3 ♀ syntypes (Brit. Mus. 1927.39).

Upolu, Malololelai, from *Pteropus tonganus*, July 1924, P. A. Buxton & G. H. E. Hopkins, 2 ♀ syntypes (Brit. Mus. 1927.39).

From *Pteropus* sp., 12.xii. 1916, H. Swale, 2 ♂ 2 ♀.

##### Fiji Islands

From *Pteropus* sp., 2 ♀ (Brit. Mus. 58.172).

Viti Levu, Katabo, from *Pteropus* sp., R. A. Lever, 21.ix. 1938, 4 ♂ (D.386).

Tamavua, from *Pteropus nawaiensis*, 15.vii. 1955, C. B. Symes, 11 ♂ 10 ♀.

Vuna, Taveuni, from *Pteropus nawaiensis*, 1955, C. B. Symes, 7 ♂ 4 ♀.

## HOST SYNONYMY

Fruit bats.      *Name on original label*

*Pteropus nawaiensis* Gray.      *Current name*

**Cyclopodia minor** Speiser, 1900

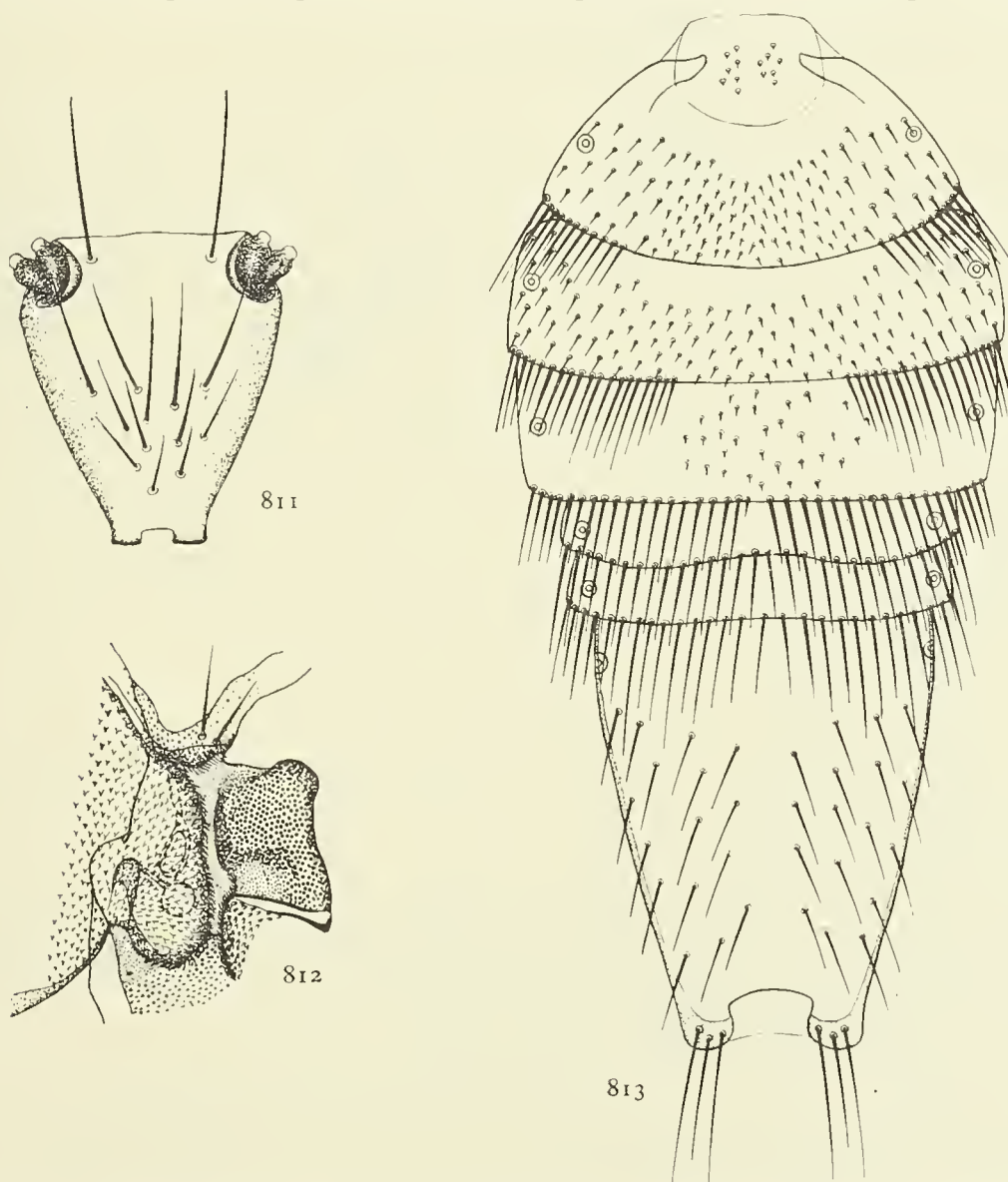
(Figs. 811–815)

*Cyclopodia minor*. Speiser, 1900, *Entom Nachr.* **26**, 291.*Cyclopodia minor* Speiser. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.*Cyclopodia minor* Speiser. Scott, 1932, *Stylops*, **1**, 25 (re-description).*Cyclopodia minor* Speiser. Theodor, 1959, *Parasitology*, **49**, 242.

Length 3.7–4 mm. Colour dark brown.

*Head.* 2 long setae near the anterior dorsal margin near the eyes. A group of 10–12 moderately long setae in the posterior part of the vertex. Eyes large.

*Thorax.* The cover of the haltere groove is attached to the notopleural suture along its whole length, not only in its posterior part as in the other species of the *sykesii* group. It does not close

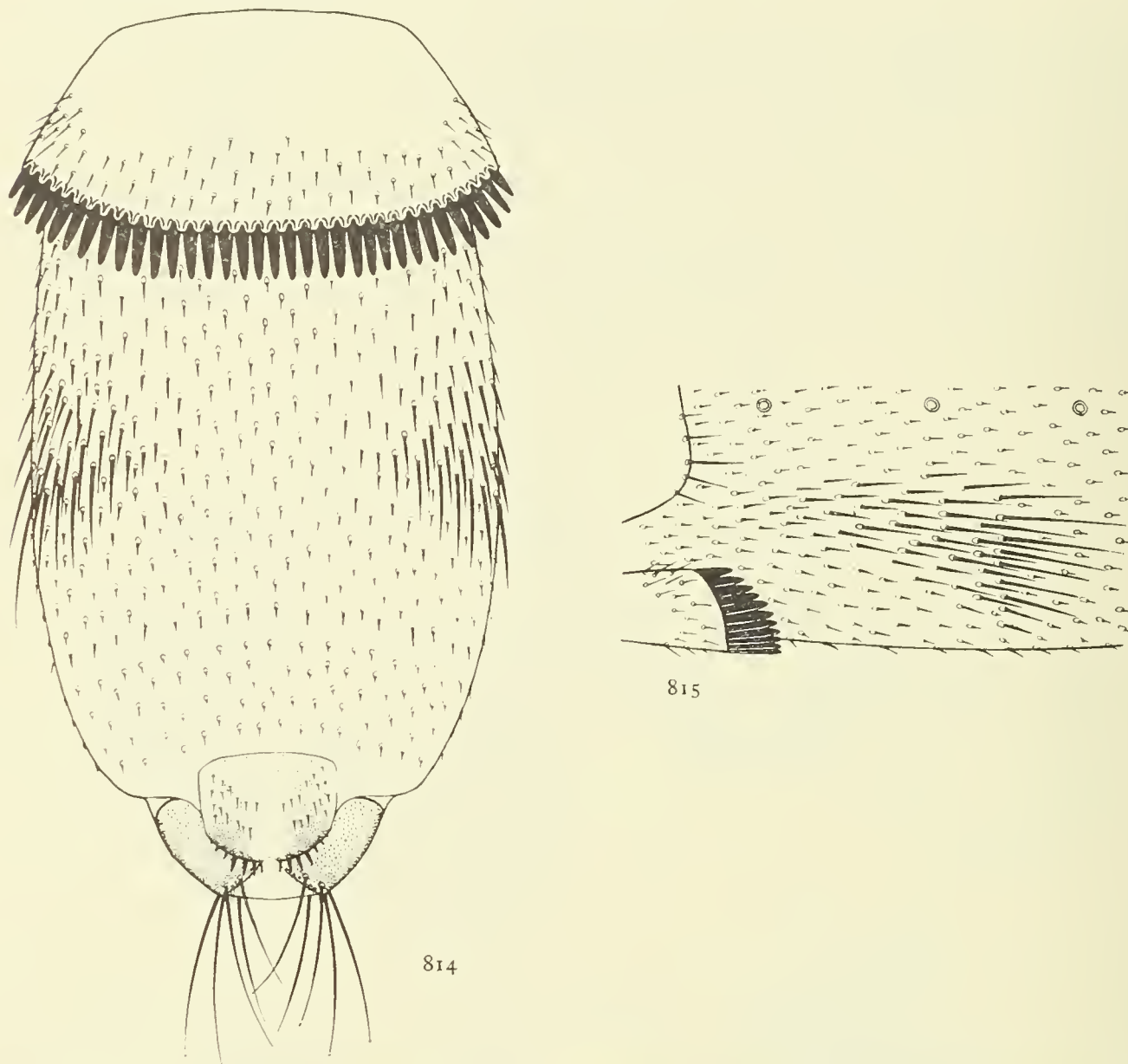


Figs. 811–813. *Cyclopodia minor* Speiser. 811. head, dorsal; 812. haltere groove; 813. male abdomen, dorsal.



the haltere groove completely. The lateral bulge is reduced, but formed as in the *pembertoni* group. Two notopleural setae.

*Male abdomen.* Tergite 1 with a group of 12–15 minute spines. Tergite 2 with 8–10 moderately long setae at the lateral corners. Tergite 3 with a similar marginal row with a wide gap in the middle. Tergites 4–6 with continuous dense marginal rows with a small gap in the middle



Figs. 814, 815. *Cyclopodia minor* Speiser. Female. 814. abdomen, ventral; 815. same, anterior part of pleura.

on tergite 4. A group of minute spines in the middle of the surface of tergite 4, tergites 5 and 6 bare, much shorter than tergite 4. Abdominal ctenidium with 33–38 spines. Sternite 5 with a row of only 6 club-shaped spines at the posterior margin.

*Genitalia.* Claspers broad, 4 times as long as wide at the base. Phallobase with short apical hook. Rod of the aedeagus 0.75 mm. long, the area of spines nearly as long as the rod.

*Female abdomen.* Tergite 1 + 2 with 7 rather long setae at the posterior corners. Dorsum of the abdomen covered with short spines, without any long setae. Some longer setae on the

pleurae anteriorly and a transverse row of longer setae which is interrupted in the middle at the hind margin of sternite 4. Genital plate (sternite 7) rectangular, with about 6 short spines at the rounded posterior margin in each half. A membranous strip in the middle and several irregular rows of very short spines obliquely across each half of the plate.

Distribution and hosts: New Britain, from *Pteropus admiralitatum*, Ponam Island, Admiralty Islands, from *Pteropus neohibernicus*.

### *Cyclopodia oxycephala* (Bigot, 1860)

(Figs. 787, 816)

*Nycteribia oxycephala*. Bigot, 1860, *Ann. Soc. Ent. France*, **8**, 227.

*Cyclopodia oxycephala* (Bigot). Speiser, 1902, *Zeitschr. syst. Hym. Dipt.* **2**, 145.

*Cyclopodia oxycephala* (Bigot). Falcoz, 1923, *Nova Caledonia*, Sarasin & Roux, **3**, 83.

*Cyclopodia oxycephala* (Bigot). Theodor, 1959, *Parasitology*, **49**, 242.

Length 4–5 mm. Head with a group of 25–30 short setae on the anterior part of the vertex, leaving the greater posterior part of the vertex bare.

Thorax and legs as in *C. sykesii*.

*Male abdomen*. As in *C. sykesii*. Abdominal ctenidium with 36–42 spines. None of the specimens examined had 48 spines as stated by Falcoz.

*Genitalia*. Phallobase with a short, broad apical hook, deeply concave basally. Rod of the aedeagus 0.8–0.9 mm. long. The area of spines of the connecting tube covers about three-quarters of the length of the rod.

*Female abdomen*. Dorsum of the abdomen covered with minute spines without any longer setae or spines. The spines on the venter are longer than on the dorsum. Genital plate (sternite 7) broader than long, consisting of lateral sclerites and a nearly square membranous median area. A row of about 10 short spines at the posterior margin in each half.

Distribution and hosts: New Caledonia. Loyalty Islands, from *Pteropus ornatus* and *P. tonganus geddiei*. New Hebrides, from *Pteropus tonganus geddiei* and *P. eotinus*.

#### MATERIAL IN THE COLLECTION

##### LOYALTY ISLANDS

Lifu, from *Rousettus* sp., one broken specimen, type, Bigot; 1 ♂, one broken specimen, paratypes, Montrouzier.

##### NEW CALEDONIA

20 specimens ex coll. Bigot, but not those originally described in 1860.

Noumea, from bats nos. 35, 36, 11.i. 1913, D. D. Montague, 3 ♂ 3 ♀.

##### NEW HEBRIDES

Hog Harbour, Espiritu Santo, from *Pteropus eotinus*, 17.i. 1927, J. R. Baker, 1 ♂ 1 ♀.

Elephant Island, near Hog Harbour, Espiritu Santo, from *Pteropus tonganus geddiei*, 1927, J. R. Baker, 2 ♂ 1 ♀.

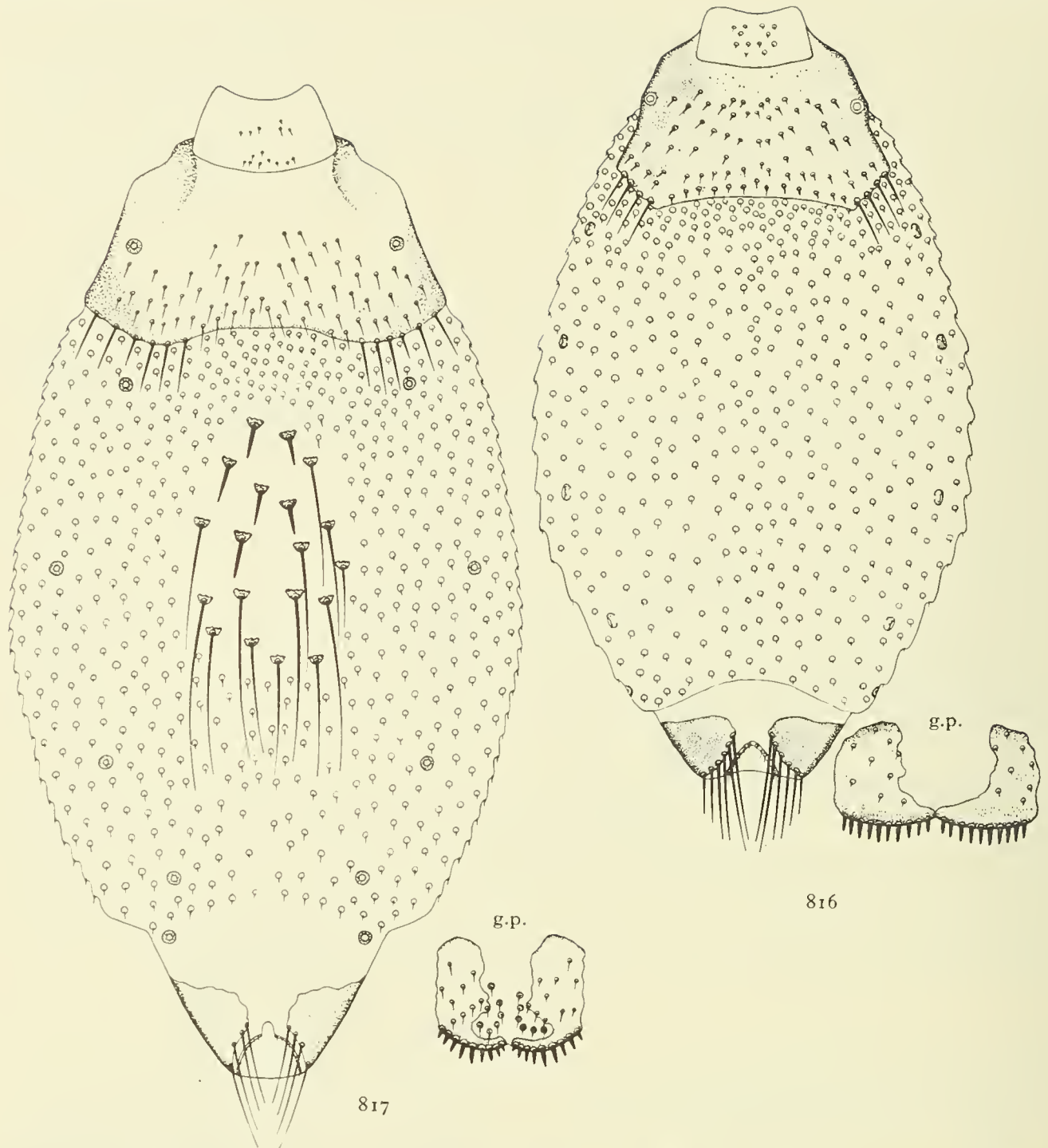
Ounua, from fruit bat, 4.v. 1929, L. E. Cheesman, 1 ♂ 1 ♀ (Brit. Mus. 1929.371).

Havanna Harbour, Efate Island, from bat, 1944, L. T. Dumbleton, 2 ♂ (Brit. Mus. 1949.343).

#### HOST SYNONYMY

Name on original label  
*Pteropus geddiei* MacGillivray.

Current name  
*P. tonganus geddiei* MacGillivray.



Figs. 816, 817. *Cyclopodia* spp. 816. *C. oxycephala* (Bigot). female abdomen, dorsal, with genital plate; 817. *C. ponapensis* Theodor. female abdomen, dorsal, with genital plate.

### *Cyclopodia ponapensis* Theodor, 1959

(Figs. 789, 817)

*Cyclopodia ponapensis*. Theodor, 1959, *Parasitology*, **49**, 242.

Length 4.5 mm. Colour dark brown.

*Head*. 2 long and several shorter setae at the anterior dorsal margin. A group of 18–25 short



setae on the anterior part of the vertex, leaving the posterior half bare. Eyes large. Labella of the proboscis slightly longer than the theca.

*Thorax.* As in *C. sykesii*. 1–2 notopleural setae.

*Male abdomen.* About 8 short spines at the lateral posterior corners of tergite 2. Abdominal ctenidium with 35 spines. About 8 short club-shaped spines at the posterior margin of sternite 5.

*Genitalia.* Phallobase with broad apical hook. Rod of the aedeagus 0.7 mm. long. The area of spines of the connecting membrane nearly as long as the rod.

*Female abdomen.* Dorsum covered with short spines which are larger than in other species. An oblong group consisting of 5–6 very long and strong spines anteriorly and 8–10 setae posteriorly in the middle of the dorsum. Genital plate rectangular, with lateral sclerites separated by a membranous strip. About 10 short spines on the posterior margin in each half.

Distribution and host: Caroline Islands. Ponape Island, from *Pteropus molossinus*.

Type series in the Chicago Natural History Museum.

### **Cyclopodia similis** Speiser, 1900

(Figs. 786, 818, 819)

*Cyclopodia similis.* Speiser, 1900, *Entom. Nachr.* **26**, 292.

*Cyclopodia similis* Speiser. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

nec *Cyclopodia similis* Speiser. Ferris, 1916, *Entom. News*, **27**, 433 (refers to *C. inclita*).

*Cyclopodia similis* Speiser. Scott, 1932, *Stylops*, **1**, 25.

nec *Cyclopodia similis* Speiser. Karaman, 1939, *Ann. Mus. Serb. merid.* **1**, 31 (refers to *C. inclita*).

*Cyclopodia similis* Speiser. Theodor, 1959, *Parasitology*, **49**, 242.

Length 5 mm. Colour reddish brown. Head, legs and thorax as in *C. sykesii*.

*Male abdomen and genitalia.* As in *C. sykesii*. Claspers 4 times as long as broad at the base. Phallobase with long, narrow apical hook. Rod of the aedeagus 0.85 mm. long. Area of spines of the connecting tube as long as the rod.

*Female abdomen.* Tergite 1 + 2 as in *C. sykesii*, but the number of setae in the lateral corners varies from 2 to 6. Dorsum of the abdomen covered with short spines. An oblong group consisting of 7–12 large, blunt spines anteriorly and 7–12 moderately long setae posteriorly in the middle of the dorsum. A transverse row of long setae at the posterior border of the dorsum between spiracles 6. 2 groups of long setae, each consisting of 6–8 setae in 2–3 rows lateral to spiracle 6. The number of setae in these groups varies widely and the row of setae in front of the anal segment may be absent. Abdominal ctenidium with 38–40 spines. Genital plate square or transversely rectangular, with a median membranous area which is wider anteriorly. About 8 spines at the posterior margin in each half.

Distribution and hosts: New Guinea, Bismarck Archipelago, New Britain, New Ireland and Tanimbar Island, from *Pteropus neohibernicus* and *P. melanopogon*.

#### MATERIAL IN THE COLLECTION

##### NEW BRITAIN

From *Pteropus neohibernicus*, Dahl, ex coll. Berlin Museum, 1 ♂ 1 ♀ syntypes.

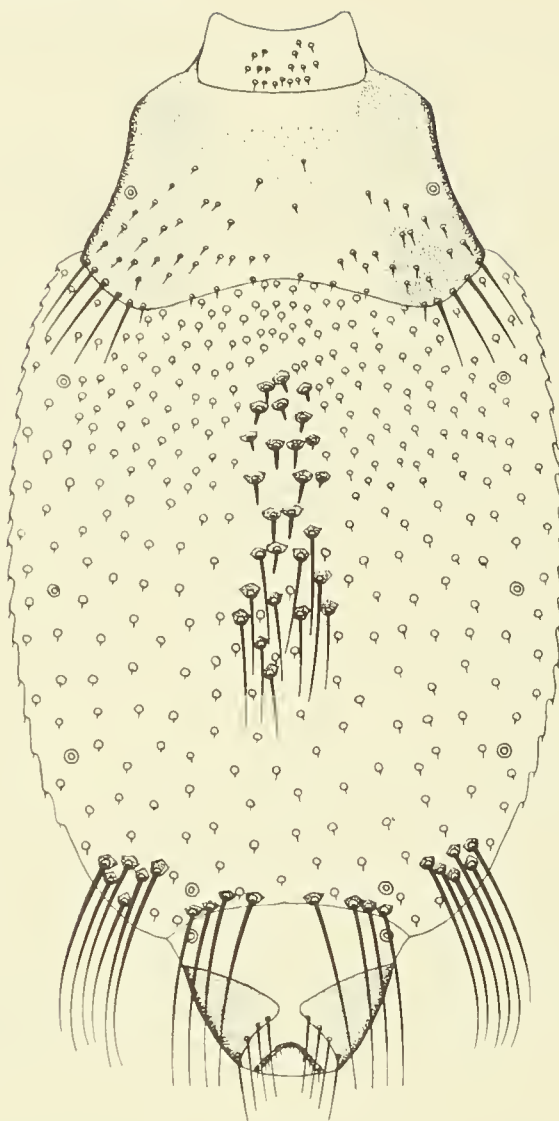
##### TANIMBAR ISLAND

Larat, Tanimbar (Timorlaut), from large fruit bat, 1908, F. Muir, no. 421, 2 ♂ 4 ♀.

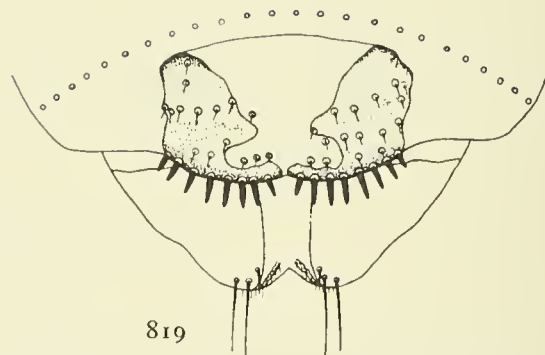
##### NEW GUINEA

Mornuna, from *Pteropus* sp.

#### OTHER MATERIAL EXAMINED



818



819

Figs. 818, 819. *Cyclopodia similis* Speiser. Female. 818. abdomen, dorsal; 819. genital plate.

#### PEMBERTONI GROUP

#### *Cyclopodia pembertoni* Scott, 1932

(Figs. 782, 820–823)

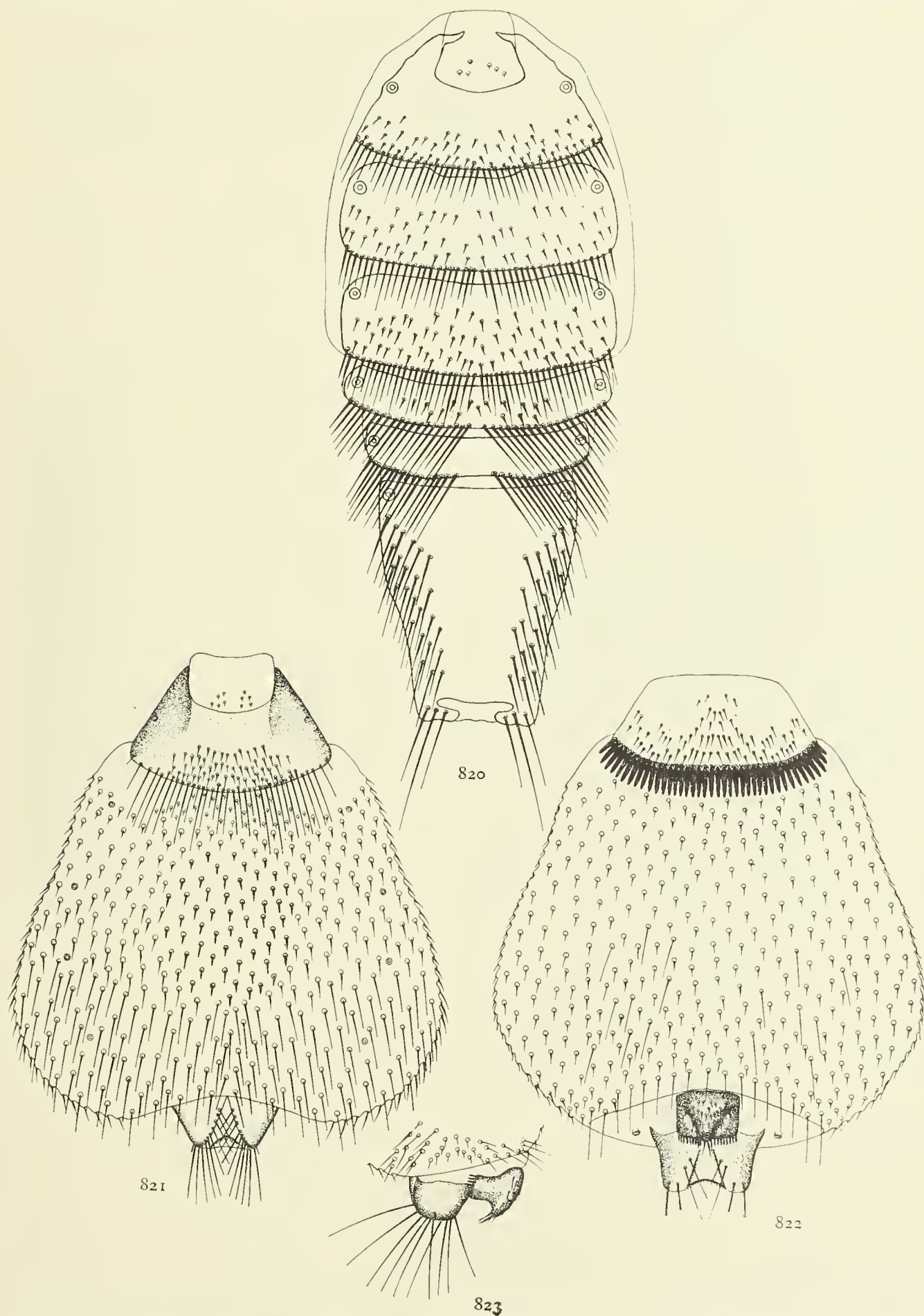
*Cyclopodia pembertoni*. Scott, 1932, *Stylops*, **1**, 25.

*Cyclopodia pembertoni* Scott. Theodor, 1959, *Parasitology*, **49**, 242.

Length 3.5–4 mm. Colour reddish brown.

*Head*. Vertex and anterior margin bare. Eyes small, less deeply separated than in the *sykesii* group, with small lenses. Antennae rounded anteriorly. Palps widening apically, with a long terminal seta, 3–4 short setae at the dorsal margin and a denser row at the ventral margin. Labella of the proboscis nearly twice as long as the theca.

*Thorax*. Median ventral suture indistinct in the middle. Angle of the oblique sutures 90°. Mesonotum slightly wider posteriorly, with a small rounded posterior plate. The posterior part of the notopleural sutures forms a flap-like expansion which covers the haltere groove



Figs. 820-823. *Cyclopodia pembedtoni* Scott. 820. male abdomen, dorsal; 821. female abdomen, dorsal; 822. same ventral; 823. genital plate and anal segment, lateral.



partly from the median side. Opposite this flap, there is a large rounded bulge which narrows the opening from the side, so that only a narrow gap remains open. 2 rather long notopleural setae. Thoracic ctenidium with about 15 blunt spines. Legs short, tibiae 4 times as long as wide in the middle, tapering towards both ends. Tibial rings close together, in the basal half of the tibia.

*Male abdomen.* Tergite 1 with 6–8 minute spines. Tergites 2–6 with continuous marginal rows of moderately long and shorter setae. A small gap in the middle of the rows of tergites 5 and 6. Tergite 2 with about 3 rows of short spines on the surface in the posterior half, tergites 3 and 4 with short spines in the posterior two-thirds and tergite 5 with an irregular double row of short spines. Tergite 6 bare. The marginal setae on tergites 5 and 6 are considerably longer than on the anterior tergites. Anal segment conical, flattened, covered with moderately long setae except for a median strip. Sternite 1 + 2 short, with a ctenidium of about 40 spines. Sternites 3 and 4 with dense marginal rows of moderately long setae. Surface covered with short spines and there is a premarginal row of long, vertical setae. Sternite 5 not much longer than 4, with slightly convex posterior margin with about 10 short, club-shaped spines in the middle.

*Genitalia.* Claspers nearly parallel-sided up to the middle, tapering to a sharp, pigmented point. Phallobase triangular, with a short apical hook. The anterior ventral processes of the phallobase are very long, ribbon-shaped and unite at about half the length of the connecting tube, forming a long process. Aedeagus rod 0.7 mm. long, thick, with an apical membranous part. The area of spines on the connecting tube as long as the rod.

*Female abdomen.* Abdomen much wider than long, flattened dorso-ventrally, trapezoidal in dorsal view in distended specimens. Tergite 1 + 2 triangular, with a convex posterior margin which bears a row of long setae. A group of short setae in the posterior part of the surface. Dorsum covered with short spines on raised tubercles anteriorly and longer setae posteriorly. The transition from spines to setae is abrupt in the middle and gradual laterally. Anal segment truncate, sharply set off from the abdomen, with a row of long setae around the anus. Sternite 1 + 2 as in the male. Ventral surface with tubercles which bear short setae and some longer setae at the limits of the segments. Sternite 7 sclerotized, with a basal horn which is covered with short spines. The apical part of the plate is bare and bears a row of 9–13 spines in each half of the posterior margin.

Distribution and host: Fiji Islands, from *Notopteris macdonaldi*.

## FIJI ISLANDS

## MATERIAL IN THE COLLECTION

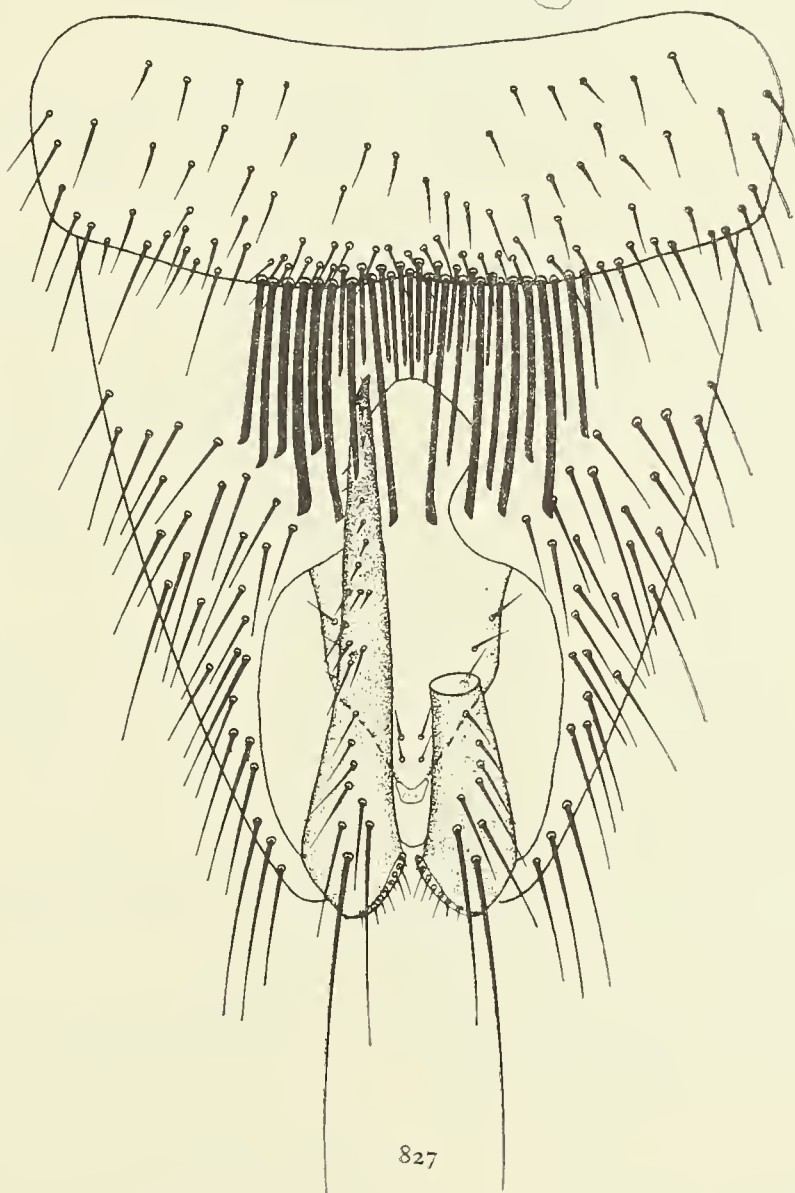
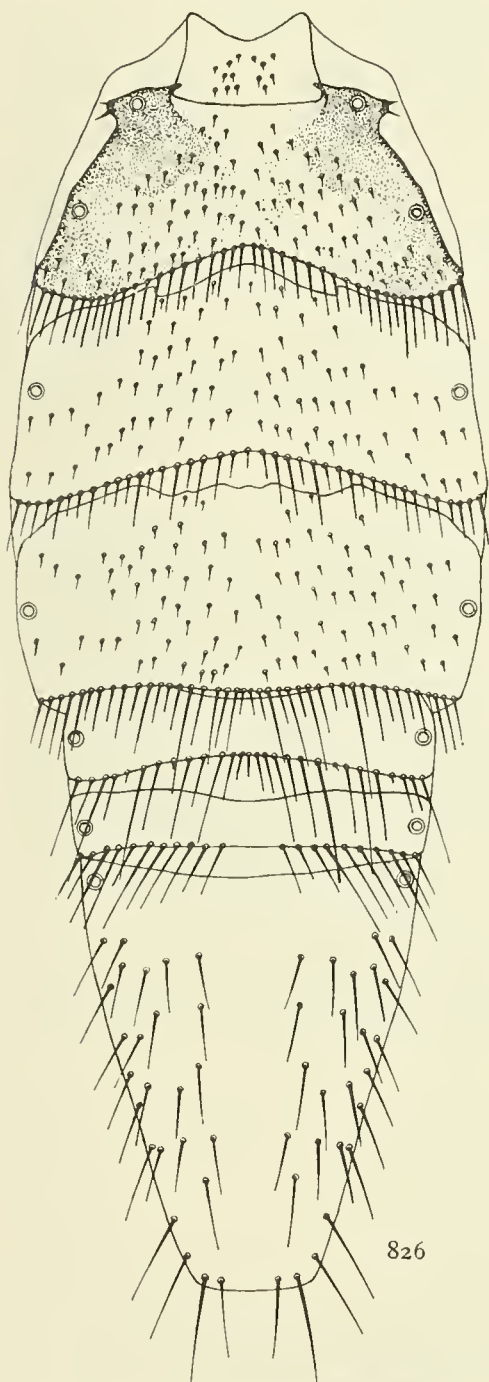
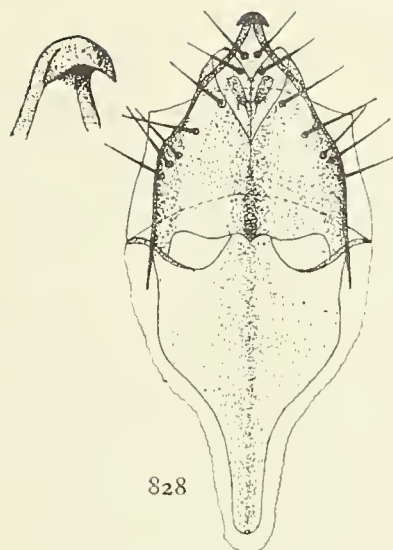
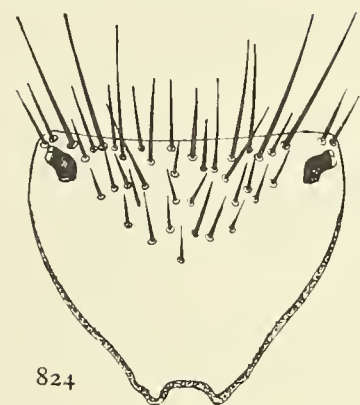
Lami, Viti Levu, no host, no date, C. E. Pemberton, ♀ holotype, 2 ♂ paratypes (Brit. Mus. 1936.99).  
Kalabu Caves, from *Notopteris macdonaldi*, 14.iv. 1955, C. B. Symes, 20 ♂ 20 ♀.

Name on original label	HOST SYNONYMY	Current name
Cave bats.		<i>Notopteris macdonaldi</i> Gray.

**Cyclopodia macracantha** Theodor, 1959

(Figs. 824–832)

*Cyclopodia macracantha.* Theodor, 1959, *Parasitology*, **49**, 242.



Figs. 824-828. *Cyclopodia macracantha* Theodor. 824. head, dorsal; 825. haltere groove; 826. male abdomen, dorsal; 827. male sternite 5 and genital area; 828. basal arc and phallobase, with hook of phallobase more highly magnified.



Length 4 mm. Colour dark brown, middle of the tergites of the male abdomen darker than the sides.

*Head.* Eyes small as in *C. pambertoni*, but with prominent lenses, deeply separated. Anterior dorsal margin with a row of about 10 setae. About 20–30 short setae between the eyes on the vertex. Terminal seta of the palps as long as the palp which is parallel-sided. Labella of the proboscis slightly longer than the theca.

*Thorax.* Slightly wider than long. Angle of the oblique sutures about 90°. Dorsal surface as in *C. pambertoni*, but there are 7–8 notopleural setae in a dense group. Haltere groove as in *C. pambertoni*, but the median flap is wider, nearly covering the groove completely.

*Male abdomen.* Spiracle 1 lies inside tergite 1 + 2 and not in the pleural membrane as in most other species. There are 1–3 short spines lateral to it. Marginal rows of tergites 2–6 continuous. The marginal row of tergite 2 consists of short spines in the middle and of longer spines laterally in some specimens, of longer spines throughout in others. The marginal row of tergites 3 and 4 are similar. Surface of tergites 2–4 covered with short spines. Tergites 5 and 6 very short, bare on the surface, with marginal rows of longer and shorter setae. A small gap present in the middle of the row of tergite 6. Sternite 1 + 2 with a ctenidium of about 40 spines. Sternite 5 shorter than 4, with a row of about 18 very long, peculiar spines at the posterior margin. Some of these spines are longer than the segment, others are shorter. Longer and shorter spines alternate. The spines have a truncate tip with a sharp point which is directed laterally in each half. Anterior to this row, there is another row of about 8 spines about half as long as those of the marginal row. These spines have normal points.

*Genitalia.* Claspers very slender, 6–7 times as long as wide at the base, tapering to a long, pigmented tip. A long seta and 2 shorter ones dorsally near the base and a double row of short setae and spines in the basal half. Basal arc triangular, with a long anterior process. Phallobase with a long apical hook with a bifid tip. Rod of the aedeagus 1.1 mm. long. The area of spines on the connecting membrane is as long as the rod.

*Female abdomen.* Tergite 1 + 2 with a marginal row of short spines in the middle and short setae laterally. Dorsum covered with short spines. In the middle of the dorsum, on a hump in distended specimens, a crescent-shaped group of about 50 setae which are longer and thicker in the middle of the group, placed on darkly pigmented tubercles. In some specimens some of the setae are replaced by very long, thick spines. A row of about 8 similar long setae in front of the anal segment. Sternite 6 with deeply concave posterior margin and only short setae in the marginal row. Sternite 7 (genital plate) shield-shaped, covered with short spines, with the point anteriorly. Posterior margin with about 15 spines in each half. Pleurae with 2 groups of setae lateral to spiracles 5 and 6 in some specimens.

Distribution and hosts: Solomon Islands, from *Pteropus mahaganus*, *P. solomonis*, *P. woodfordi* and *Dobsonia inermis*.

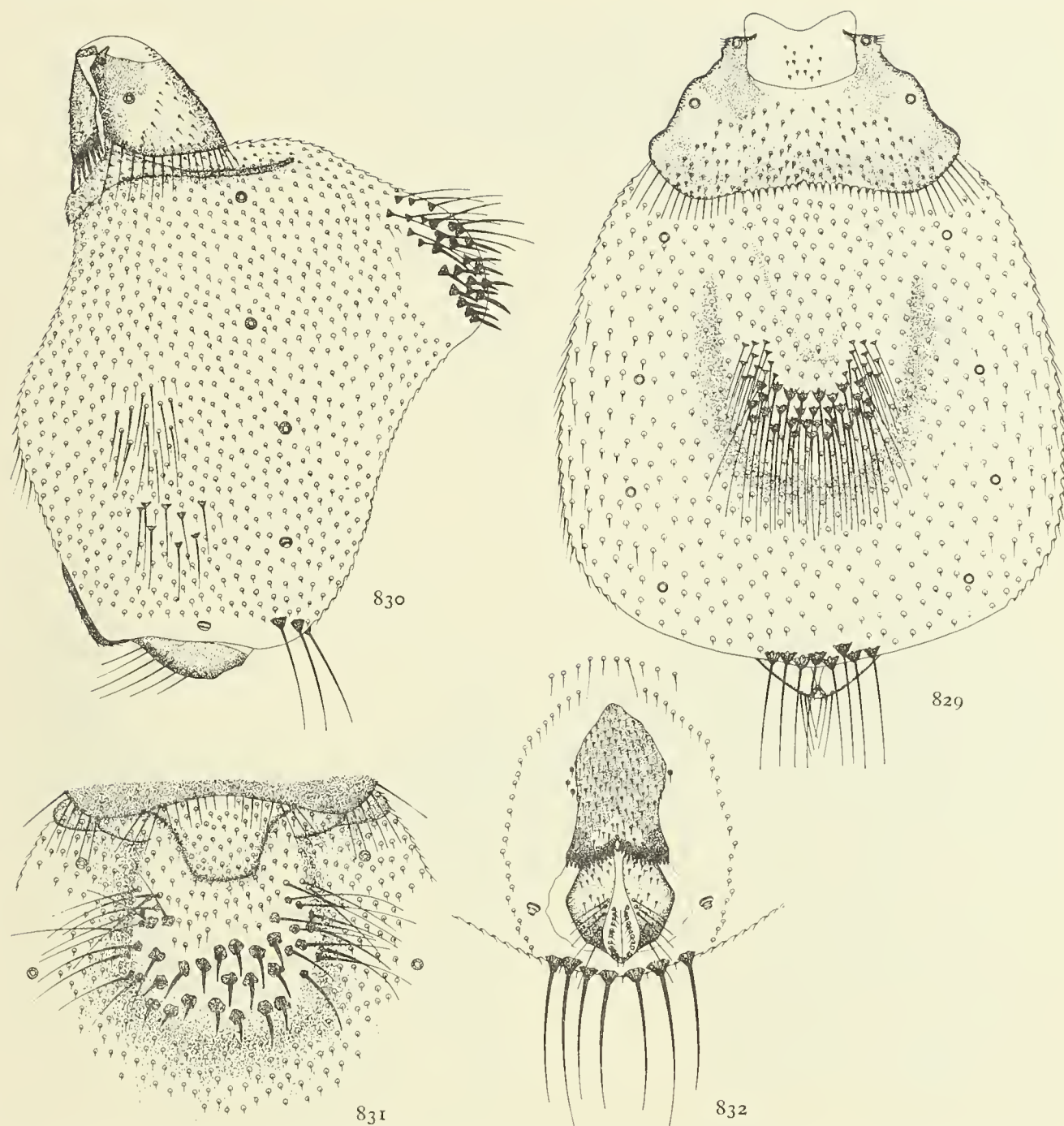
#### MATERIAL IN THE COLLECTION

##### SOLOMON ISLANDS

Fatura, Santa Isabel Island, from *Dobsonia inermis*, Mar. 1932, R. J. A. Lever, ♂ holotype.

Lunga, Guadalcanal, from *Pteropus woodfordi*, Feb. 1932, R. J. A. Lever, 1 ♂ paratype.





Figs. 829-832. *Cyclopodia macracantha* Theodor. Female. 829. abdomen, dorsal; 830. same, lateral; 831. dorsal hump of abdomen in a specimen with large spines instead of setae; 832. genital plate and anal segment.

### GREEFFI GROUP

#### *Cyclopodia greeffi greeffi* Karsch, 1884

(Figs. 28, 34, 44-46, 53, 780, 783, 794, 833-837)

*Cyclopodia greeffi*. Karsch, 1884, *Sitzungsber. Ver. Befoerd. Naturwiss.* **77**.

*Cyclopodia rubiginosa*. Bigot, 1891, *Ann. Soc. Ent. France*, **60**, 386.

*Cyclopodia greeffi* Karsch. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia rubiginosa* Bigot. Speiser, 1902, *Zeitschr. syst. Hym. Dipt.* **2**, 145

*Cyclopodia greeffi* Karsch. Rodhain & Bequaert, 1916, *Bull. Soc. Zool. France*, **40**, 248.

*Cyclopodia greeffi* Karsch. Scott, 1917, *Parasitology*, **9**, 593.

*Cyclopodia greeffi* Karsch. Falcoz, 1924, *Bull. Mus. Hist. Nat. Paris*, **30**, 223.

*Cyclopodia greeffi* Karsch. Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117.

*Cyclopodia greeffi* Karsch. Theodor, 1957, *Parasitology*, **47**, 457.

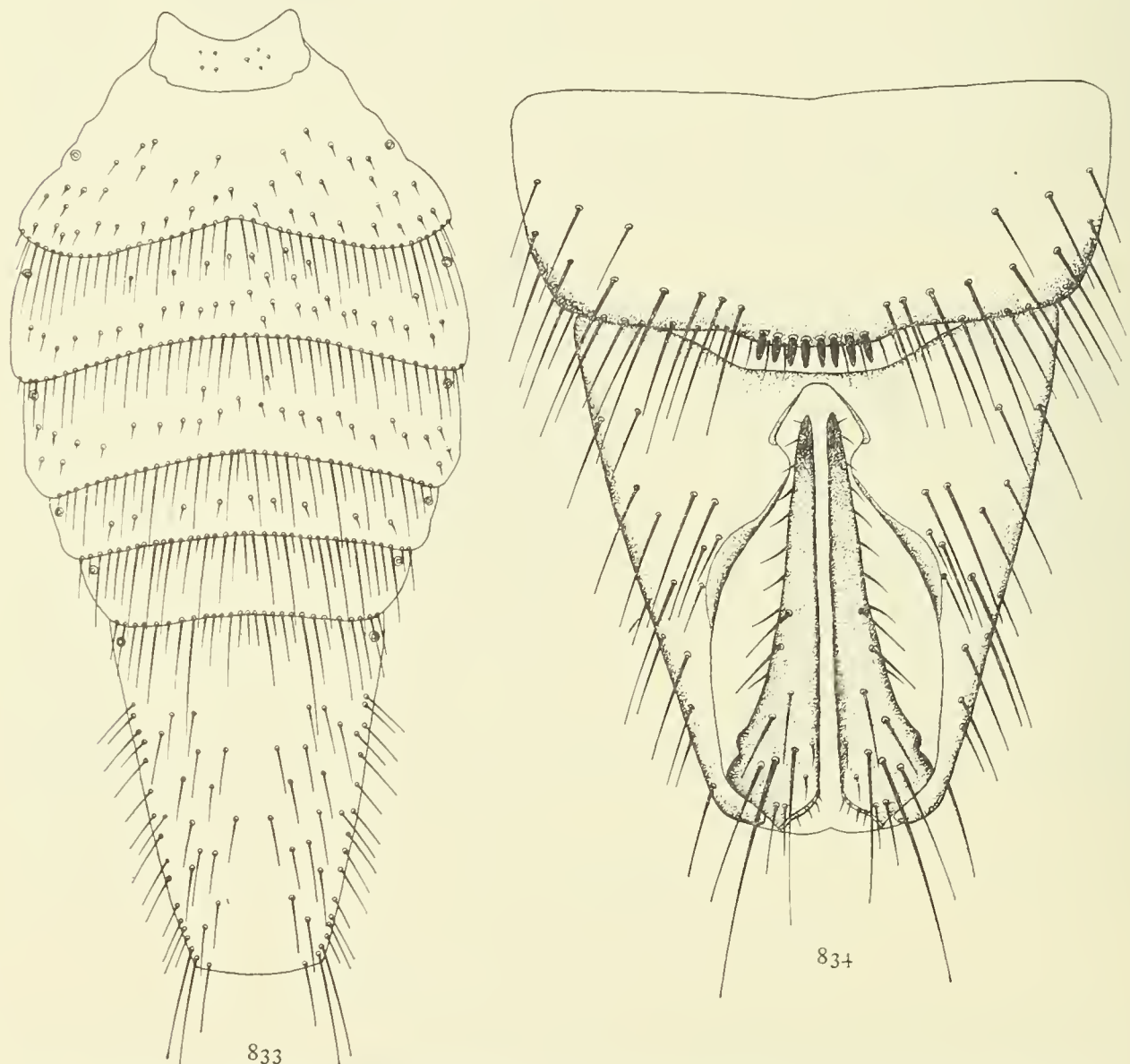
*Cyclopodia greeffi* Karsch. Theodor, 1959, *Parasitology*, **49**, 242.

Length 4 mm. Colour reddish brown.

*Head.* Two setae at the anterior dorsal margin. Vertex bare. Eyes large, with well-separated lenses. Terminal seta of the palp as long as the palp. Labella of the proboscis slightly longer than the theca.

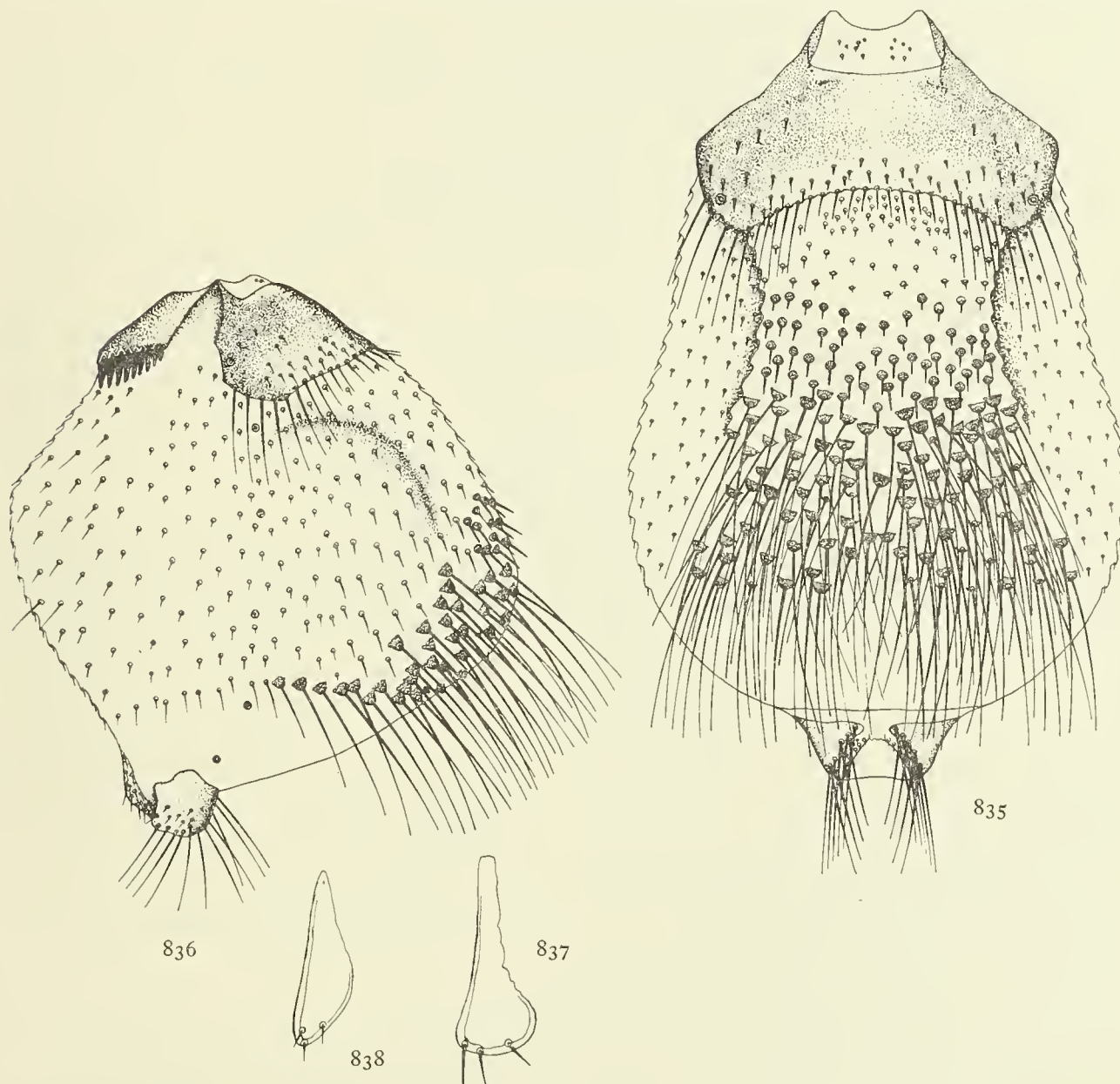
*Thorax.* Slightly wider than long. Sternal median suture indistinct in the middle. Angle of the oblique sutures  $90^\circ$ . Only a single notopleural seta. Haltere groove open. Tibiae 5.5 times as long as wide, with oblique rings in the middle.

*Male abdomen.* About 10 minute spines on tergite 1. The marginal rows of all tergites are



Figs. 833, 834. *Cyclopodia greeffi* Karsch. Male. 833. abdomen, dorsal; 834. sternite 5 and genital area.

continuous and consist of longer and shorter setae. Short spines on the surface of tergite 1 + 2 and on tergite 3 and only a double row on tergite 4. Tergites 5 and 6 are shorter than the anterior tergites, but not as short as in the *sykesii* group. They have marginal rows of longer setae and are bare on the surface. There is a single row of spines on tergite 5 in some specimens. Sternite 1 + 2 with a ctenidium of 40-44 thick, blunt spines. Sternite 5 with convex hind margin which



Figs. 835-838. *Cyclopodia greeffi* Karsch. 835. female abdomen, dorsal; 836. same, lateral; 837. male paramere; 838. same of *C. greeffi arabica*.

bears a row of 6-10 spines which are not club-shaped and longer and thinner than in *C. sykesii*.

**Genitalia.** Claspers long and slender, tapering to a long, pigmented point, 6.5 times as long as wide at the base. One long and 2 shorter setae dorsally near the base and a double row of short setae on the dorsal surface. Phallobase with a long, slender hook. Basal arc with a long, conical anterior process and a posterior concavity. Rod of the aedeagus 1.2 mm. long, tapering



to a fine point. The rod articulates basally with a short U-shaped sclerite. The area of spines on the connecting membrane covers only about half of the length of the rod and the spines are shorter than in *C. sykesii*.

*Female abdomen.* Tergite 1 + 2 large, triangular, with slightly concave posterior margin and a marginal row of setae which are longer laterally. Surface covered with spines in the posterior part. Dorsum covered with short spines which become longer posteriorly. The posterior part of the abdomen is covered with a rectangular group of very long setae, about 70–80 in 7–8 rows. The posterior row reaches further laterally than the anterior ones. The last 3 rows in front of the group of setae consist of very long and thick spines. Pleurae covered with short spines anteriorly and short setae posteriorly. Between the group of setae and the anal segment the dorsum is bare. The spiracles are small, about half the diameter of those of *C. sykesii*. The anal segment is short, truncate, with 2 rows of long setae around the anus. The abdomen is truncate posteriorly, nearly square in dorsal view. The ventral surface is nearly flat, but the dorsal surface is bent, the anterior and the posterior halves standing at right-angles to each other, so that the abdomen appears triangular or rhomboidal in side view. Sternite 1 + 2 as in the male, but longer. Ventral surface with short spines. The rows of spines on sternite 6 do not reach the sides. Sternite 7 (genital plate) is formed by a transversely elliptical area of spines on sclerotized bases which is incompletely divided in the middle. The posterior margin bears a curved row of about 15 long, blunt spines in each half. There are about 100 spines in the area in 6–8 rows. The bases of the spines are confluent in the median anterior part of the area.

Distribution and hosts: throughout Tropical Africa between 10° lat. North and South, mainly on *Eidolon helvum*, rarely on *Rousettus* and *Epomophorus*. See Map 1.

## MATERIAL IN THE COLLECTION

## IVORY COAST

Assinie, C. Alluaud, ♂ holotype of *C. rubiginosa* Bigot.

## NIGERIA

Lagos, from fruit bat, Nov. 1904, K. Strachan, N. C. Rothschild, 4 ♂ 4 ♀.

Lagos, from *Eidolon helvum*, Apr. 1954, 20 ♂ 20 ♀.

Ogbomosho, from fruit bat, 11.ix. 1920, A. W. J. Pomeroy, 10 ♂ 10 ♀ (Brit. Mus. 1921.466).

## CAMEROONS

Ossidinje, Mamfe, Cross River, from large bat, 1.xi. 1915, A. W. J. Pomeroy, 4 ♂ 3 ♀ (Brit. Mus. 1919.272).

## PORTUGUESE GUINEA

Gunnal, from *Epomophorus* sp., nos. 21–22, 22.vi. 1909, 2 ♂ 4 ♀.

## FERNANDO PO

Seimund, Fernando Po Exploration Committee, 2 ♂.

## SÃO TOME ISLAND

From *Eidolon helvum*, ix.x. 1920, F. W. Urich, 13 ♂ 10 ♀. (Some puparia.)

From large fruit bat, 1929, T. A. Barns, 2 ♂.

## CONGO

Stanleyville, Sept. 1932, J. Schwetz, 1 ♂ (Brit. Mus. 1931.543).

Leopoldville, from *Eidolon helvum*, July 1916, J. Bequaert, 1 ♂ 2 ♀.

## FRENCH EQUATORIAL AFRICA

Tuburi Marsh, F. Talbot, 1 ♂ (Brit. Mus. 1911.440).

## UGANDA

Mbale, June 1950, P. C. C. Garnham, 2 ♀.

Kampala, from *Eidolon helvum*, Febr. 1948, J. S. Perry, 14 ♂ 5 ♀ (Brit. Mus. 1950.282).

## KENYA

Kaimosi, from *Eidolon helvum*, Dec. 1948, D. E. McInnes, 6 ♂ 4 ♀ (Brit. Mus. 1949.343).

## ZANZIBAR

Bat Island, from flying fox, 7.xii. 1910, W. M. Anders, A. Copland, 1 ♂ (Brit. Mus. 1911.226).

**Cyclopodia greeffi arabica** Theodor, 1954

(Fig. 838)

*Cyclopodia greeffi arabica*. Theodor, 1954, in Lindner, *Fliegen d. Palaearkt. Region*, **66a**, 42.*Cyclopodia greeffi arabica*. Theodor, 1957, *Parasitology*, **47**, 457.*Cyclopodia greeffi arabica*. Theodor, 1959, *Parasitology*, **49**, 242.

The subspecies differs from the typical form in having only 35–50 long setae on the abdomen in 5–6 rows. The area of spines on sternite 7 consists of about 65 spines in 5–6 rows. In the male, the only difference noted is the form of the parameres which have a pointed apical end.

Distribution and hosts: Arabia, from *Eidolon sabaeum* and *Rousettus aegyptiacus*.

## MATERIAL IN THE COLLECTION

## ARABIA

Lahej, from *Rousettus aegyptiacus* (probably *R. arabicus*), 5.iii. 1895, Col. Yerbury, ♀ holotype, 3 ♂ paratypes.

Aden, from *Eidolon sabaeum*, Col. Yerbury, ex coll. Dr Sharp, 2 ♂ 2 ♀ paratypes (Brit. Mus. 1936.768).

## HOST SYNONYMY

<i>Name on original label</i>	<i>Current name</i>
<i>Xantharpyia straminea</i> Geoffroy.	<i>Eidolon sabaeum</i> Andersen.

**Cyclopodia dubia** (Westwood, 1835)

(Figs. 839–843)

*Nycteribia dubia*. Westwood, 1835, *Trans. Zool. Soc. Lond.* **1**, 275.? *Nycteribia blainvillii*. Latreille, 1816–19 (nec Leach), *Nouv. Dict. Hist. Natur.* p. 23 (*vide* Speiser, 1901).*Nycteribia dubia* Westwood. Kolenati, 1856, *Parasiten d. Chiropteren*, Bruenn.*Nycteribia dubia* Westwood. Kolenati, 1863, *Hor. Soc. Ent. Ross.* **2**, 9.*Cyclopodia dubia* (Westwood). Speiser, 1901, *Arch. Naturgesch.* **67**, 11.*Cyclopodia dubia* (Westwood). Karaman, 1948, *Rad. Acad. Jugoslav.* **273**, 117.*Cyclopodia dubia* (Westwood). Theodor, 1957, *Parasitology*, **47**, 457.*Cyclopodia dubia* (Westwood). Theodor, 1959, *Parasitology*, **49**, 242.

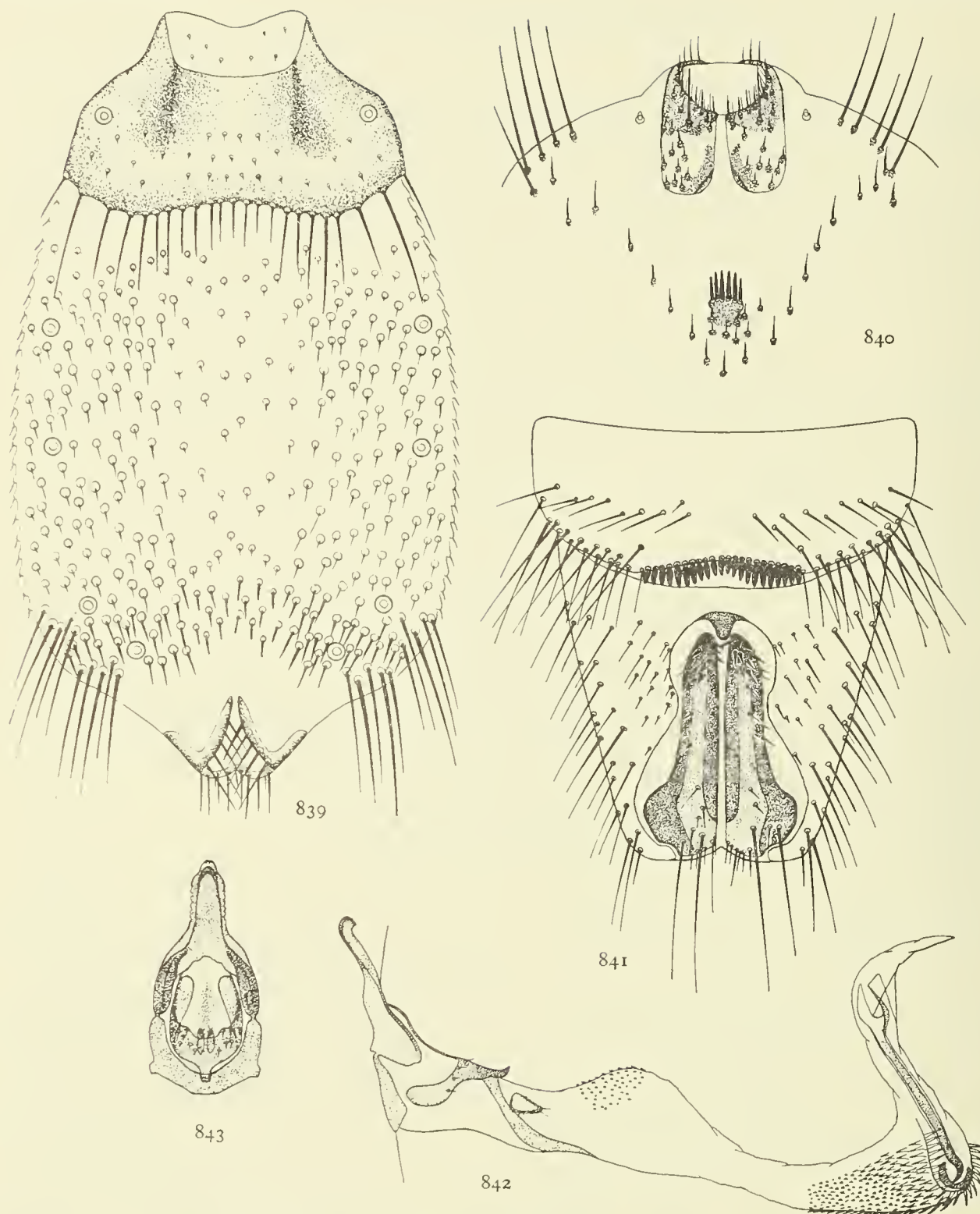
Length 3.5–4 mm. Colour brown.

*Head*. Vertex and anterior margin bare. Eyes markedly smaller than in *C. greeffi*. Lenses deeply separated. Labella of the proboscis 1.5 times as long as the theca.

*Thorax*. Thoracic ctenidium with about 16 thick, blunt spines. One notopleural seta. Median ventral suture indistinct in the middle. Angle of the oblique sutures 95°. Haltere groove open. Tibiae short, with 3 oblique rings in the middle, about 5 times as long as wide.

*Male abdomen*. Tergite 1 with about 10 minute spines. All tergites with continuous marginal rows of longer and shorter vertical setae. The setae are longer on the posterior tergites. Tergite 2 with 2–3 rows of setae on the surface, tergites 3–6 bare. Tergites 5 and 6 much shorter than 4. Anal segment long, nearly cylindrical. Sternite 1 + 2 with a ctenidium of about 40 spines. Sternite 5 with a row of about 15–20 long, thick, but not club-shaped spines at the hind margin.

*Genitalia*. Claspers thick and short, straight, with rounded, pigmented tips which bear a group of spines. 3 long setae dorsally near the base and a few short setae on the dorsal surface. There is a rounded process at the ventral anterior margin of the anal segment opposite the tip of the claspers. Basal arc Y-shaped, with a long, blunt anterior process and a deep posterior concavity. Basal plate strip-like, curved. Phallobase short, with a deep concavity at the base and a



Figs. 839-843. *Cyclopodia dubia* (Westwood). 839. female abdomen, dorsal; 840. same, ventral, posterior part; 841. male sternite 5 and genital area; 842. male genitalia extended; 843. basal arc and phallobase.

short, thick hook. The basal bulb of the connecting tube is covered with scale-like spines dorsally and posteriorly. Rod of the aedeagus short, thick, 0.5 mm. long, with a semi-circular basal sclerite. The rod is bifid apically and forms a partial frame around the gonopore. The area of spines on the connecting tube is about as long as the rod.



*Female abdomen.* The abdomen appears rectangular in dorsal view and is flattened dorso-ventrally to some extent. The marginal row of tergite 1 + 2 consists of longer setae laterally and shorter setae in the middle. The dorsum of the abdomen is covered with minute spines in a broad median strip and with larger spines laterally and on the pleurae. 2-3 rows of still longer spines at the posterior margin of the spinose area. 2-3 rows of setae on the pleurae posteriorly, between spiracles 5 and 7. Anal segment very short, sclerotized only in a narrow strip on the dorsal side. These strips widen ventrally into rectangular sclerites covered with short spines. Spiracles small as in *C. greeffi*. Sternite 1 + 2 as in the male, but longer. Sternite 7 (genital plate) small, triangular, with 6-10 long spines posteriorly.

Two triangular, darkly pigmented areas at the anterior margin of the pleurae, where the inner surface of femur 3 touches the abdomen.

Distribution and host: Madagascar, from *Eidolon dupreanum*.

## MATERIAL IN THE COLLECTION

## MADAGASCAR

Ankarana, from *Pteropus* sp., Apr. 1951, R. Paulian, 2 ♂ 1 ♀.

## TENUIS GROUP

**Cyclopodia tenuis** Schuurmans Stekhoven & Hardenberg, 1938

(Figs. 844-848)

*Cyclopodia tenuis.* Schuurmans Stekhoven & Hardenberg, 1938, *Capit. Zool.* 8, 1.

*Cyclopodia tenuis.* Schuurmans Stekhoven, 1942, *Zeitschr. Parasitenk.* 12, 507 (description of female).

*Cyclopodia tenuis* Schuurmans Stekhoven & Hardenberg. Theodor, 1959, *Parasitology*, 49, 242.

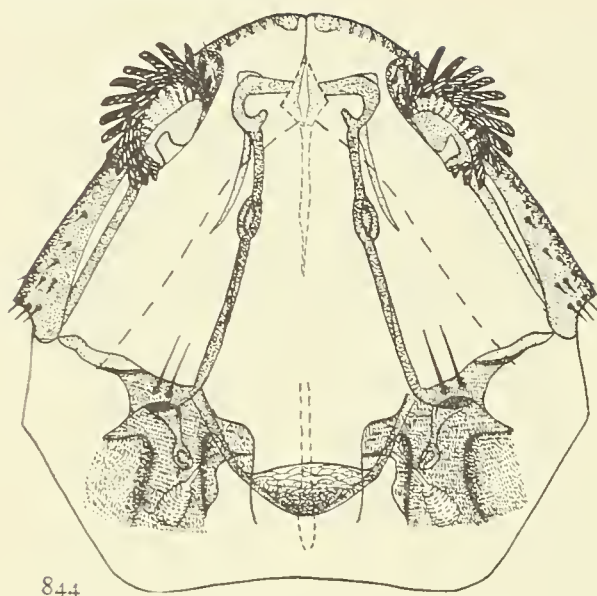
Length 2-2.5 mm. Colour yellowish.

*Head.* Vertex bare, 2 short setae at the anterior dorsal margin. Eyes with deeply separated, small lenses. Palps with short terminal seta. Labella of the proboscis as long as the theca.

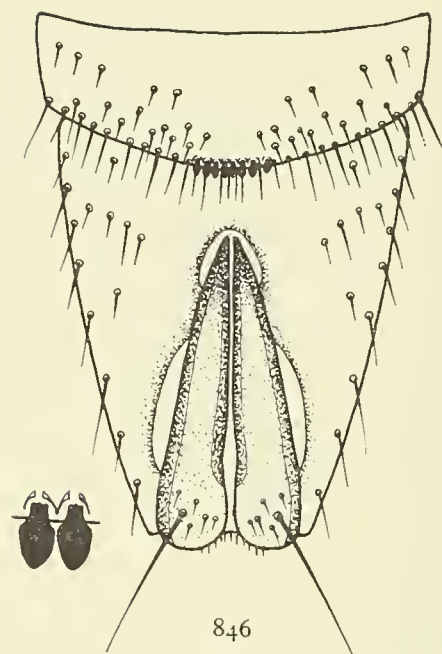
*Thorax.* As long as wide, rounded and much narrower anteriorly. Thoracic ctenidia with about 15 blunt spines. Median ventral suture indistinct in the middle. Angle of the oblique sutures about 80°. Posterior margin of the sternal plate with only a few setae laterally. 1 or 2 notopleural setae. Haltere groove open. The sclerite connecting the thoracic ctenidium with coxa 2 is narrowly triangular and bears 2-3 rows of setae posteriorly. Anterior coxae very long, three-fifths of the length of the front femur. Tibia 1 slightly shorter than femur 1. Tibial rings in the middle of the tibia. Tibiae 4 times as long as wide.

*Male abdomen.* Tergite 1 + 2 triangular. Tergite 1 with a group of 8-10 spines which are longer than in other species of the group. Marginal row of tergite 2 continuous, consisting of moderately long setae. A few short setae on the surface. Tergites 3-6 with similar marginal rows and bare on the surface. Tergites 5 and 6 very short. Anal segment long and broad. Sternite 1 + 2 trapezoidal, with a ctenidium of 45 spines. Sternite 5 short, with a convex posterior margin which bears 8 short, club-shaped spines in the middle.

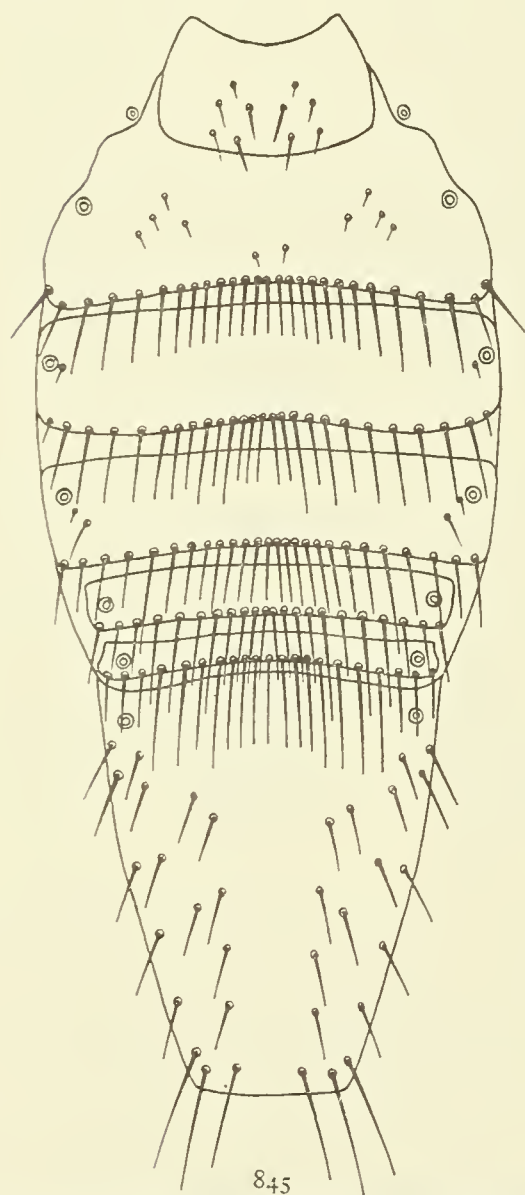
*Genitalia.* Claspers straight, tapering to a pigmented tip, about 5 times as long as wide at the base. One long and several short setae dorsally near the base. Basal arc triangular, with pointed anterior process. Phallobase triangular, with a narrow, long, apical hook. Rod of the aedeagus



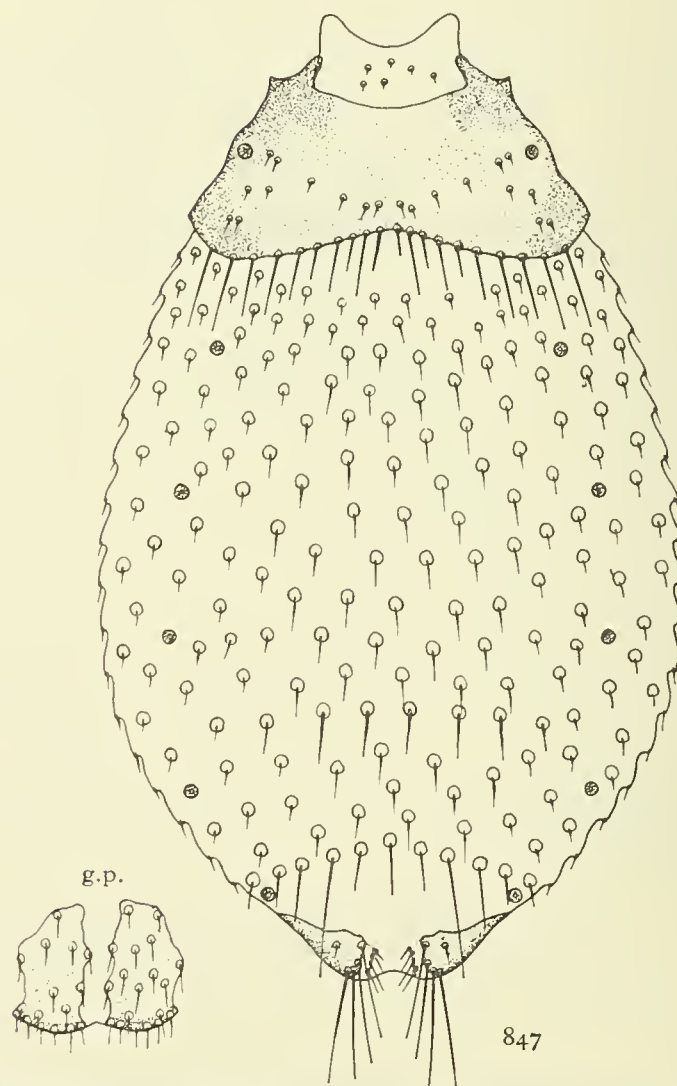
844



846



845



847

Figs. 844-847. *Cyclopodia tenuis* Schuurmans Stekhoven & Hardenberg. 844. thorax, dorsal; 845. male abdomen, dorsal; 846. male sternite 5 and genital area; 847. female abdomen, dorsal, and genital plate.

very short, thin, 0.33 mm. long, widening slightly towards the tip. The area of spines on the connecting tube is longer than the rod.

*Female abdomen.* Tergite 1 + 2 with a marginal row of moderately long setae which are placed further apart and are longer laterally. The dorsum of the abdomen is covered with short spines anteriorly and laterally. A transverse row of longer spines is present in the posterior part of the abdomen. The posterior row of the spinose area has a few longer setae. Anal segment short, rounded, with a row of long setae around the anus. Sternite 1 + 2 as in the male. Sternite 7 square, with a narrow membranous median strip and 5-6 long, thin spines at the posterior margin in each half.

Distribution and host: Java, Moluccas, from *Macroglossus minimus*.

## MATERIAL IN THE COLLECTION

## JAVA

From *Macroglossus minimus*, 1 ♂ (Brit. Mus. 79.62).  
From *Megaderma spasma trifolium*, W. E. Balston &  
G. C. Shortridge, N. C. Rothschild, 1 ♀ (Brit. Mus.  
1913.450).

## MOLUCCAS

Gilolo, Halmahera, from *Macroglossus minimus*  
(probably *M. lagophilus*), 1 ♀ (Brit. Mus. 1911.103).

**Cyclopodia (?) inflatipes** Speiser, 1900

(Figs. 850, 852, 853)

*Cyclopodia inflatipes*. Speiser, 1900, *Entom. Nachr.* **26**, 291.

*Cyclopodia inflatipes* Speiser. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia (?) inflatipes* Speiser. Theodor, 1959, *Parasitology*, **49**, 242.

*C. inflatipes* was described from a single female from New Guinea. The description would fit any species of the *tenuis* group. The following description is based on specimens from New Guinea which are provisionally considered as belonging to this species.

Length 2-2.5 mm. Colour yellowish brown.

*Head.* Vertex bare. Two short setae at the anterior dorsal margin. Eyes with deeply separated lenses. Labella of the proboscis as long as the theca.

*Thorax.* Very similar to that of *C. tenuis*. 3 notopleural setae.

*Male abdomen.* Very similar to that of *C. tenuis*, except that there are a few scattered short setae on the surface of tergites 2-4. 10-15 very short hairs on tergite 1.

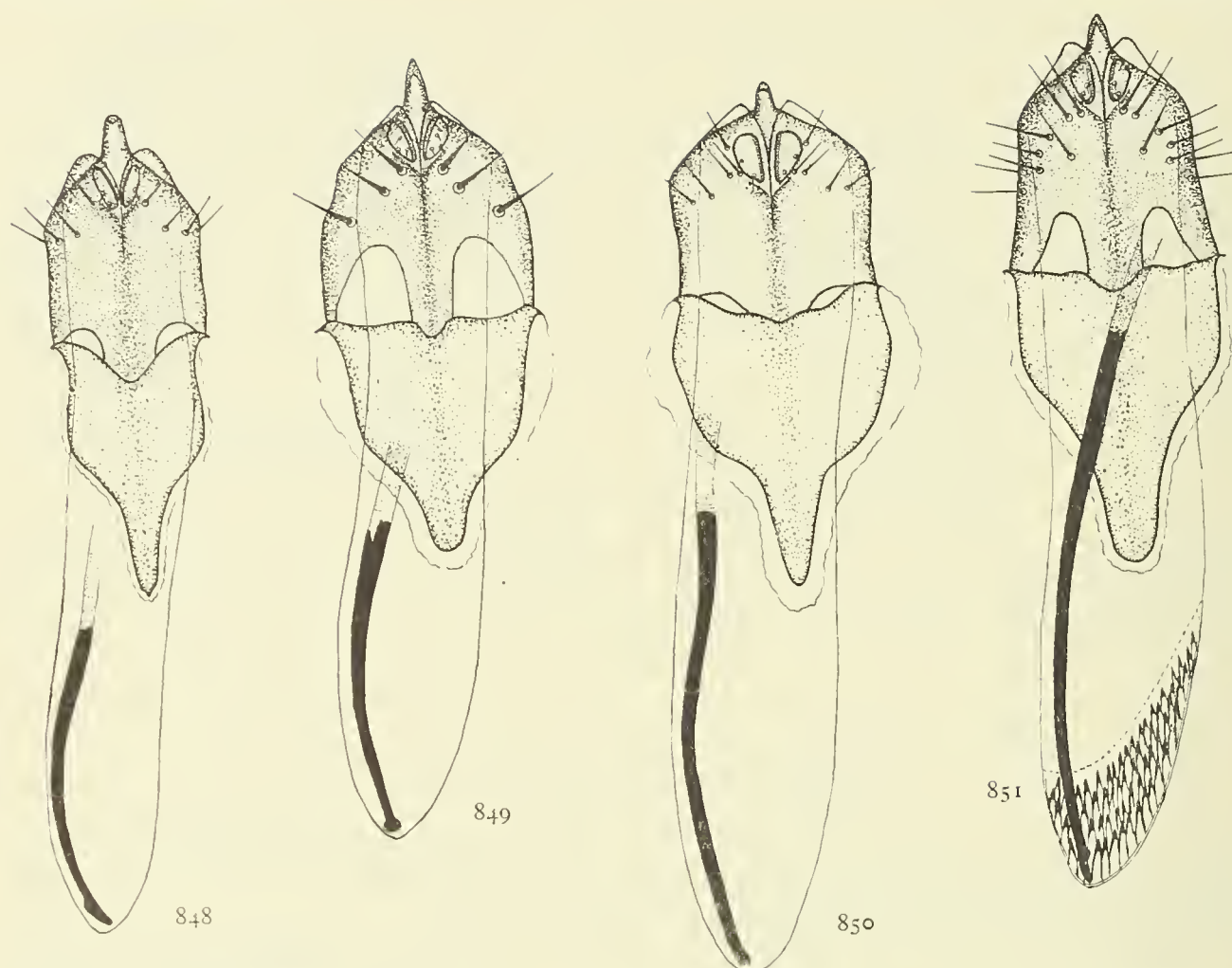
*Genitalia.* Basal arc broad, with a long anterior process. Phallobase with a short apical process and about 10 setae. Rod of the aedeagus longer than in *C. tenuis*, 0.45 mm. long. The area of spines on the connecting membrane is longer than the rod.

*Female abdomen.* The short setae on tergite 2 are more numerous than in *C. tenuis* and the marginal setae are more widely spaced in the middle. The posterior row of long setae on the dorsum is more widely spaced than in *C. tenuis* and has a gap in the middle. Sternite 7 with lateral sclerites which are wider anteriorly. Only 3-4 short spines at the posterior margin in each half.

The species is closely related to *C. tenuis* and this may eventually prove a subspecies of it.

Distribution and host: New Guinea, Papua, from *Syconycteris* sp.





Figs. 848–851. Male genitalia of species of the *tenuis* group: 848. *C. tenuis*; 849. *C. solomonarum*; 850. *C. (?) inflatipes*; 851. *C. truncata*.

### *Cyclopodia solomonarum* Theodor, 1959

(Fig. 849)

*Cyclopodia solomonarum*. Theodor, 1959, *Parasitology*, **49**, 242.

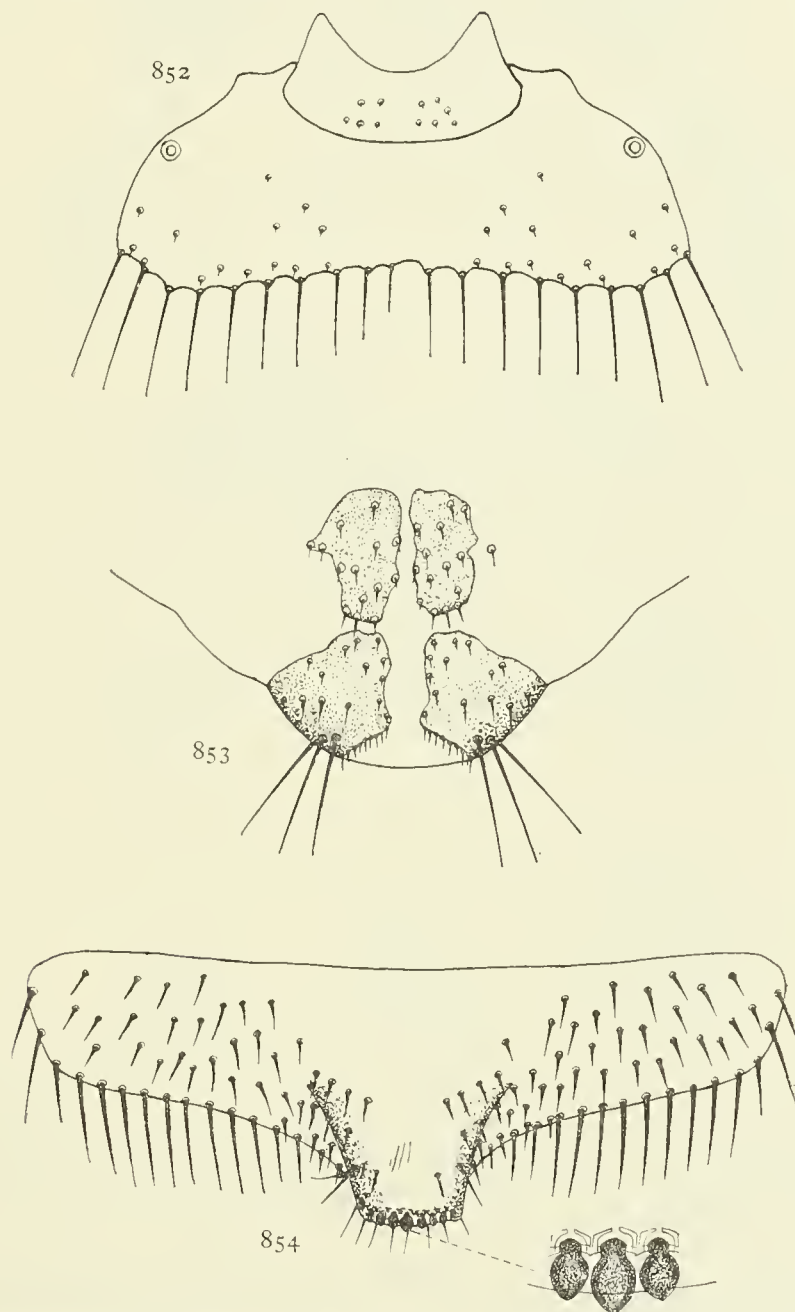
Length 2.5 mm. Colour yellowish.

**Head.** 6–8 setae near the anterior dorsal margin. Labella of the proboscis as long as the theca.

**Thorax.** As in *C. tenuis*. 3 notopleural setae. Fore-coxae very long, cone-shaped, three-quarters of the length of the femur.

**Male abdomen.** 10 minute spines on tergite 1. Tergite 2 with a marginal row of 3–4 longer setae at the lateral corners and short spines in the middle. Surface with short spines and some longer setae in the anterior lateral parts. Tergites 3 and 4 with similar marginal rows. 2–3 rows of short spines on the surface. Tergites 5 and 6 very short, bare on the surface, with uniform, continuous marginal rows of longer setae. Anal segment very broad, conical, heavily sclerotized, darker brown than the rest of the abdomen. Abdominal ctenidium with 42 spines. Sternite 5 with convex posterior margin with 8 club-shaped spines at the posterior margin.

*Genitalia.* Claspers heavily sclerotized, tapering to a blunt point, 4 times as long as wide at the base. Basal arc broad, triangular, with a broadly rounded anterior process. Phallobase with a long slender hook. Rod of the aedeagus 0.33 mm. long. The area of spines on the connecting membrane longer than the rod.



Figs. 852-854. *Cyclopodia* spp. *C. (?) inflatipes* Speiser. Female. 852. tergite 2; 853. anal segment, with genital plate; *C. truncata* Theodor. Male. 854. sternite 5.

*Female abdomen.* Tergite 1 + 2 with 1-2 longer setae at the lateral corners and with short spines in the middle of the posterior margin. Dorsum of the abdomen covered with short spines which are longer posteriorly in the middle. Anal segment very short, with a row of setae around the anus. Sternite 7 (genital plate) consisting of lateral sclerites with 4-6 thin spines at the posterior margin in each half.

## MATERIAL IN THE COLLECTION

## SOLOMON ISLANDS

Yandina, Russell Island, from *Pteropus* sp., June 1932, R. J. A. Lever, ♂ holotype, 1 ♀ paratype.

**Cyclopodia truncata** Theodor, 1959

(Figs. 851, 854)

*Cyclopodia truncata*. Theodor, 1959, *Parasitology*, **49**, 242.

Length 3 mm. Colour yellowish.

*Head*. As in *C. tenuis*. Vertex bare, 2 setae at the anterior dorsal margin. Labella of the proboscis as long as the theca.

*Thorax*. As in *C. tenuis*. Angle of oblique sutures 90°. Haltere groove open. One notopleural seta. Fore coxae two-thirds the length of the femur.

*Male abdomen*. Only 4 minute spines on tergite 1. Marginal rows of tergites 2–4 continuous, uniform, consisting of short setae and some short spines. Short spines on the lateral posterior part of the surface of tergite 2, about 30 on each side. Tergites 3 and 4 with only 10–15 spines laterally on the surface. Tergites 5 and 6 very short, bare on the surface, with longer setae in the marginal rows. Sternite 5 with a truncate, broad process arising from the middle of the surface, which bears a row of 8 short, club-shaped spines.

*Genitalia*. Claspers thick, 4 times as long as wide at the base. Rod of aedeagus 0.6 mm. long. Phallobase with a short, pointed apical hook.

Female unknown.

## MATERIAL IN THE COLLECTION

## NEW BRITAIN

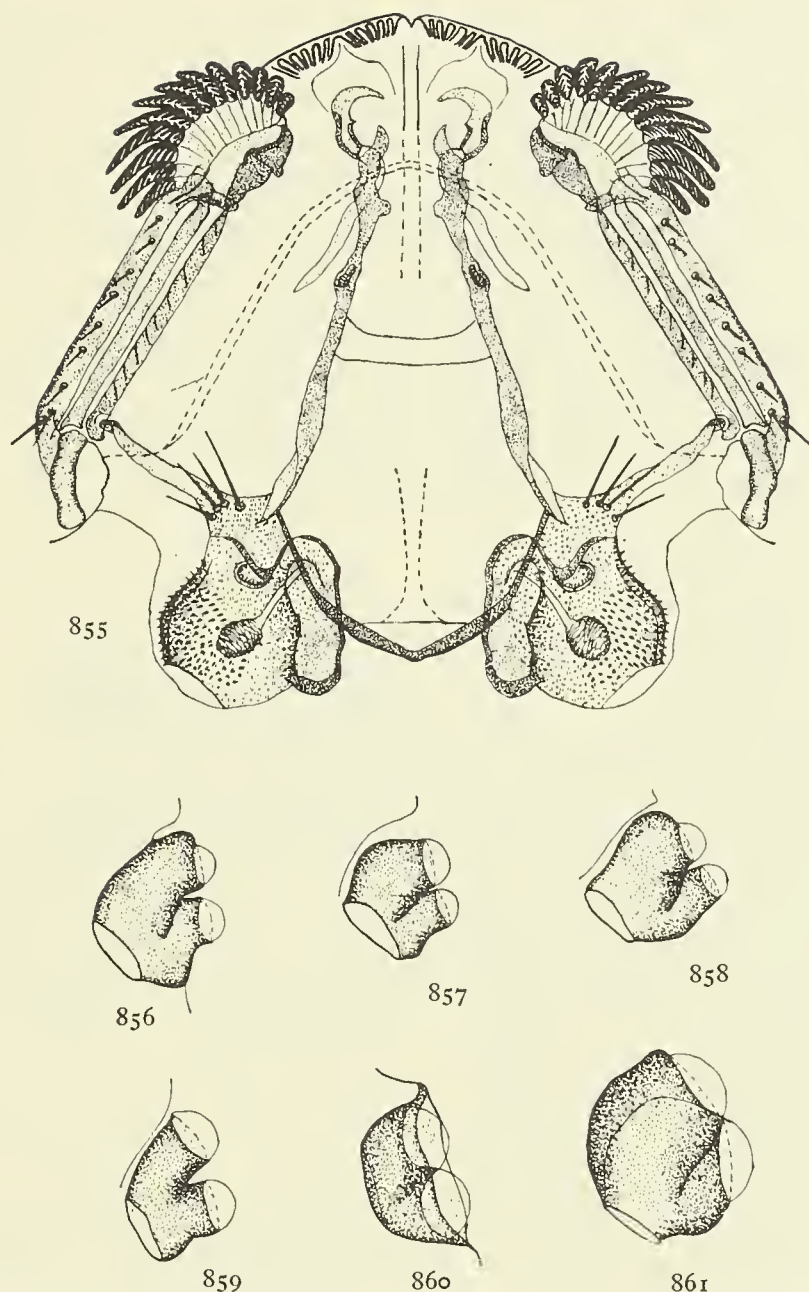
Mioko Island, near Duke of York Island, from *Melonycteris melanops*, ♂ holotype (Brit. Mus. 1911.103).

SUBGENUS **LEPTOCYCLOPODIA** Theodor, 1959

*Leptocyclopodia*. Theodor, 1959, *Parasitology*, **49**, 242. Type species: *Nycteribia ferrarii* (Rondani, 1878).

Slender insects with a long and narrow anal segment in the male. Palps slender, tapering, with a long terminal seta. Eyes with lenses more or less deeply separated. The sclerite connecting the thoracic ctenidium with coxa 2 bears a single row of spines. Post-spiracular sclerite with or without a short spine. Abdominal tergites of the male with continuous marginal rows. Tergite 5 as long as, or longer than, tergite 4. No armature of spines at the posterior margin of sternite 5 of the male. *Male genitalia*: Claspers with an armature of spines or specialized setae in some species, without them in others. Aedeagus wholly or partly sclerotized and with an apodeme. Endophallic structures present in some species. Phallobase bifid in some species, with or without an armature of spines dorsally. Segmentation of the female abdomen less reduced than in the typical subgenus. Rows of setae may be present at the posterior margin of some segments on dorsum and venter. Sclerites present on tergite 6 and on sternites 5–7 or 6–7. Sternite 7 not transformed into a genital plate. Anal sclerite present or not.





Figs. 855-861. *Cyclopodia* spp. *C. (Leptocyclopodia) ferrarii* (Rondani). 855. thorax, dorsal; eyes of species of the subgenus *Leptocyclopodia*; 856. *C. ferrarii*; 857. *C. ferrarii* from Ceylon; 858. *C. ferrarii palawanensis*; 859. *C. brachythrinx*; 860. *C. simulans*; 861. *C. macrura*.

***Cyclopodia (Leptocyclopodia) ferrarii ferrarii* (Rondani, 1878)**

(Figs. 855-857, 862-872, 874, 875)

*Nycteribia ferrarii*. Rondani, 1878, *Ann. Mus. Civ. Hist. Natur. Genova*, **12**, 150.

*Nycteribia minuta*. v.d. Wulp, 1884, *Dipt. Midden Sumatra Nat. Hist.*, Leyden (*fide* Speiser, 1907).

*Cyclopodia ferrarii* (Rondani). Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia ferrarii* (Rondani). Scott, 1914, *Ann. Mag. Nat. Hist.* **14**, 209.

*Cyclopodia ferrarii* (Rondani). Scott, 1917, *Parasitology*, **9**, 593.

*Cyclopodia ferrarii* (Rondani). Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

*Cyclopodia ferrarii* (Rondani). Phillips, 1924, *Spol. Zeyl.* **13**, 65.

*Cyclopodia ferrarii* (Rondani). Schuurmans Stekhoven & Hardenberg, 1938, *Capit. Zool.* **8**, 1.

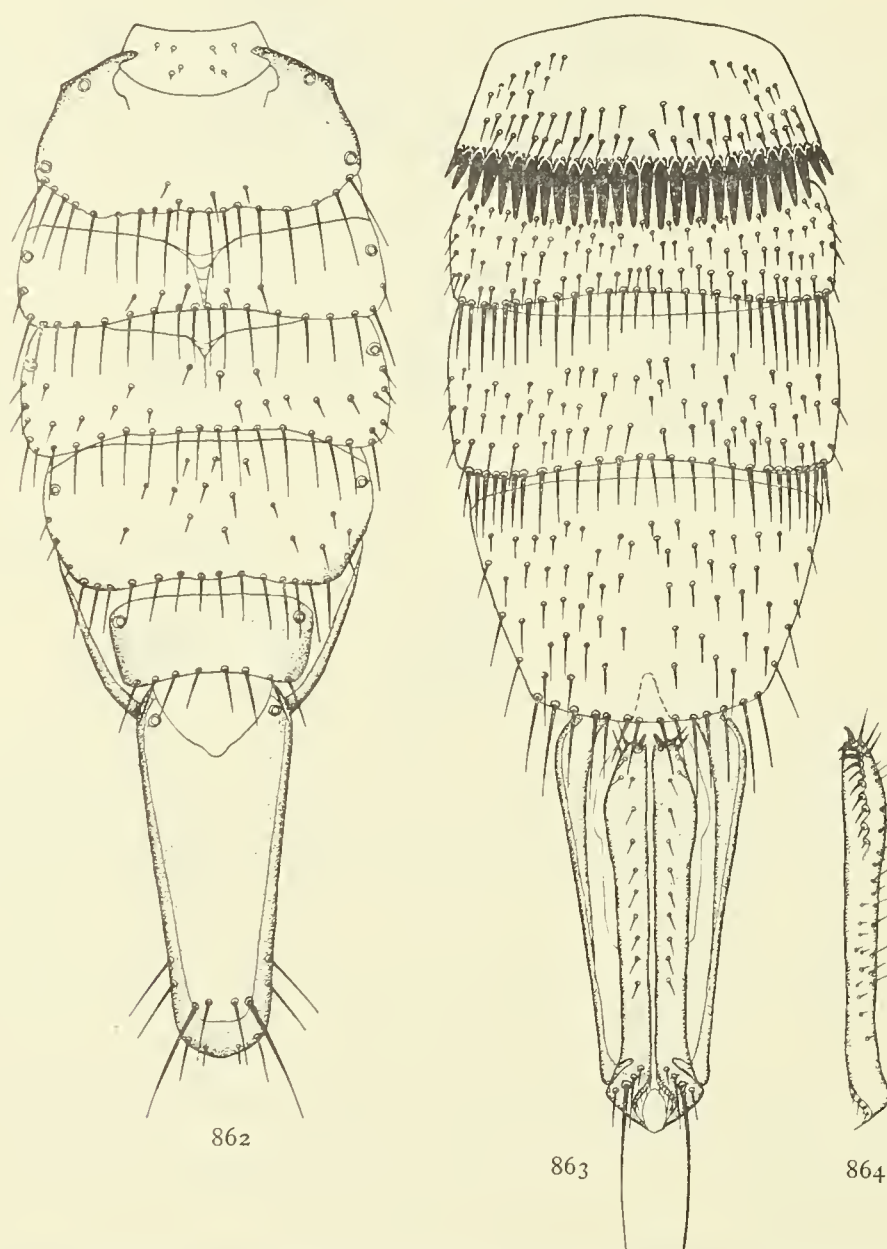
*Cyclopodia ferrarii* (Rondani). Hiregaudar & Bal, 1956, *Agra Univ. Jour. Res. Science*, **5**, 1.

*Cyclopodia ferrarii* (Rondani). Theodor, 1959, *Parasitology*, **49**, 242.

Length 2.5 mm. Colour yellowish brown.

*Head.* Two setae at the anterior dorsal margin. Eyes large, with incompletely separated, large shallow lenses. Palps long and slender, flattened laterally, with long terminal seta. Labella of the proboscis as long as the theca.

*Thorax.* Slightly longer than wide. Angle of the oblique sutures about 90°. Thoracic ctenidium with about 13 spines. The sclerite connecting the ctenidium with coxa 2 consists of 2 narrow strips, the ventral strip bearing a single row of spines. The posterior margin of the sternal plate is bare except for a few spines laterally. Haltere groove open. 3-4 notopleural setae in a row. Fore coxae very long and slender, about two-thirds of the length of the femur.



Figs. 862-864. *Cyclopodia ferrarii* (Rondani). Male. 862. abdomen, dorsal; 863. same, ventral; 864. clasper, ventral.

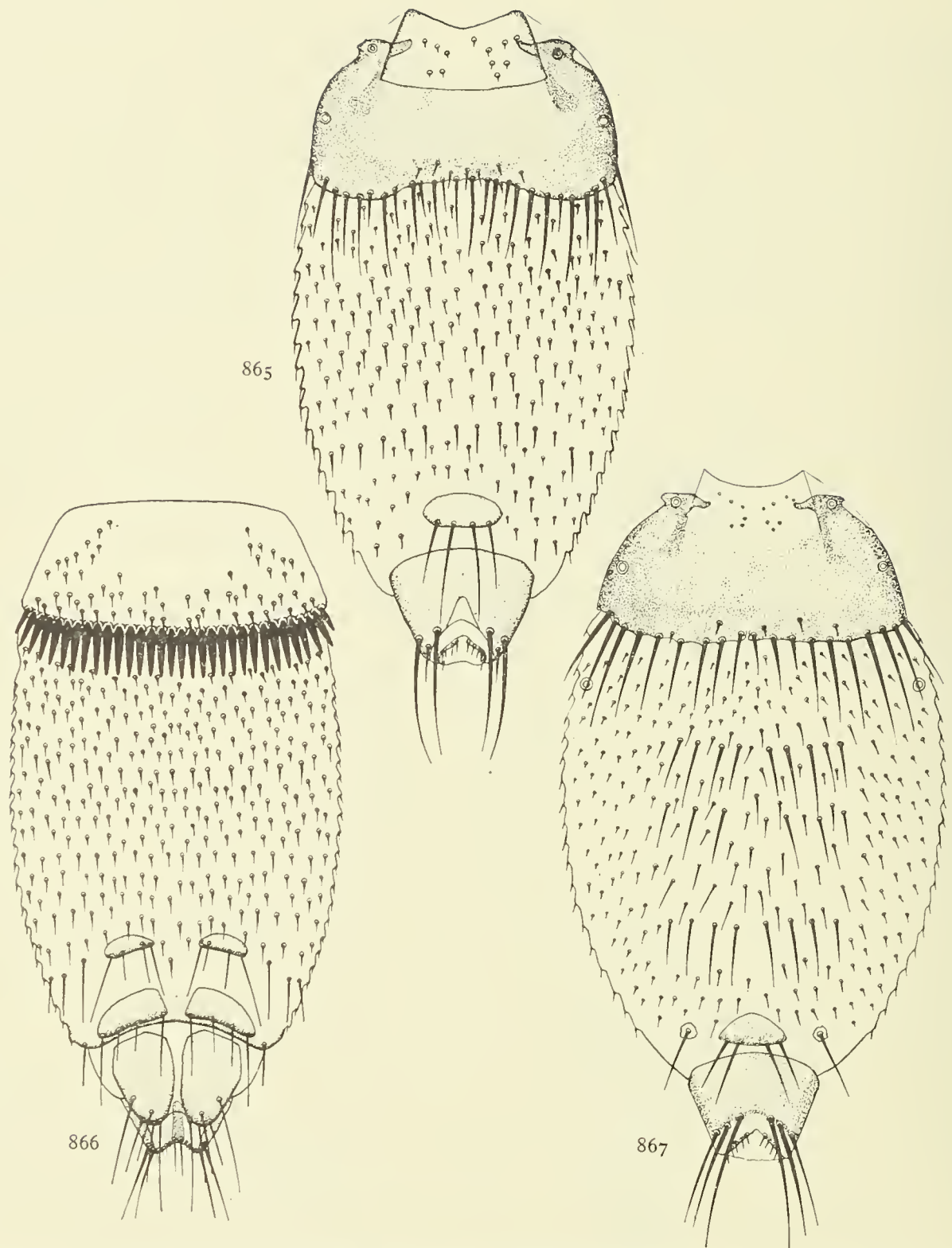
Fore tibia as long as the femur, 5.5 times as long as wide, with 3 rings close together in the middle. Tibia 2 broader, 4.5 times as long as wide. Length of legs 2.7–2.8 mm. Basitarsus 1 very long (0.85 mm.), basitarsus 3 shorter (0.65 mm.).

*Male abdomen.* Post-spiracular sclerite without spines. Tergite 1 + 2 with convex posterior margin. Spiracle 1 lying inside the sclerite. 2 groups of 6–7 minute spines on tergite 1. Tergite 2 with a marginal row of widely spaced, thick setae of moderate length and a premarginal row of 4 short setae. Tergites 3 and 4 with similar marginal rows and 1–3 rows of short setae on the surface. Tergite 5 longer than tergite 4, with a marginal row of shorter vertical setae and 2–3 rows of short setae on the surface. Tergite 6 shorter and narrower than tergite 5, with a similar marginal row and bare surface. Anal segment very long and slender, slightly tapering apically, 2.5–3 times as long as wide at the base in specimens in alcohol. Anterior margin of the dorsal surface deeply concave; 2 long and 2 shorter setae in the posterior part of the dorsal surface, 2 setae at the sides and a row of short setae at the posterior margin; surface otherwise bare. Sternite 1 + 2 short, with a ctenidium of about 30 thick, blunt spines. Sternites 3 and 4 with uniform marginal rows of thick setae which are placed more closely laterally; surface covered with short setae. Sternite 5 trapezoidal, as long as sternites 3 and 4 together, with a row of long setae at the posterior margin and some shorter and thinner setae in the middle. Surface covered with short spines anteriorly and longer setae posteriorly.

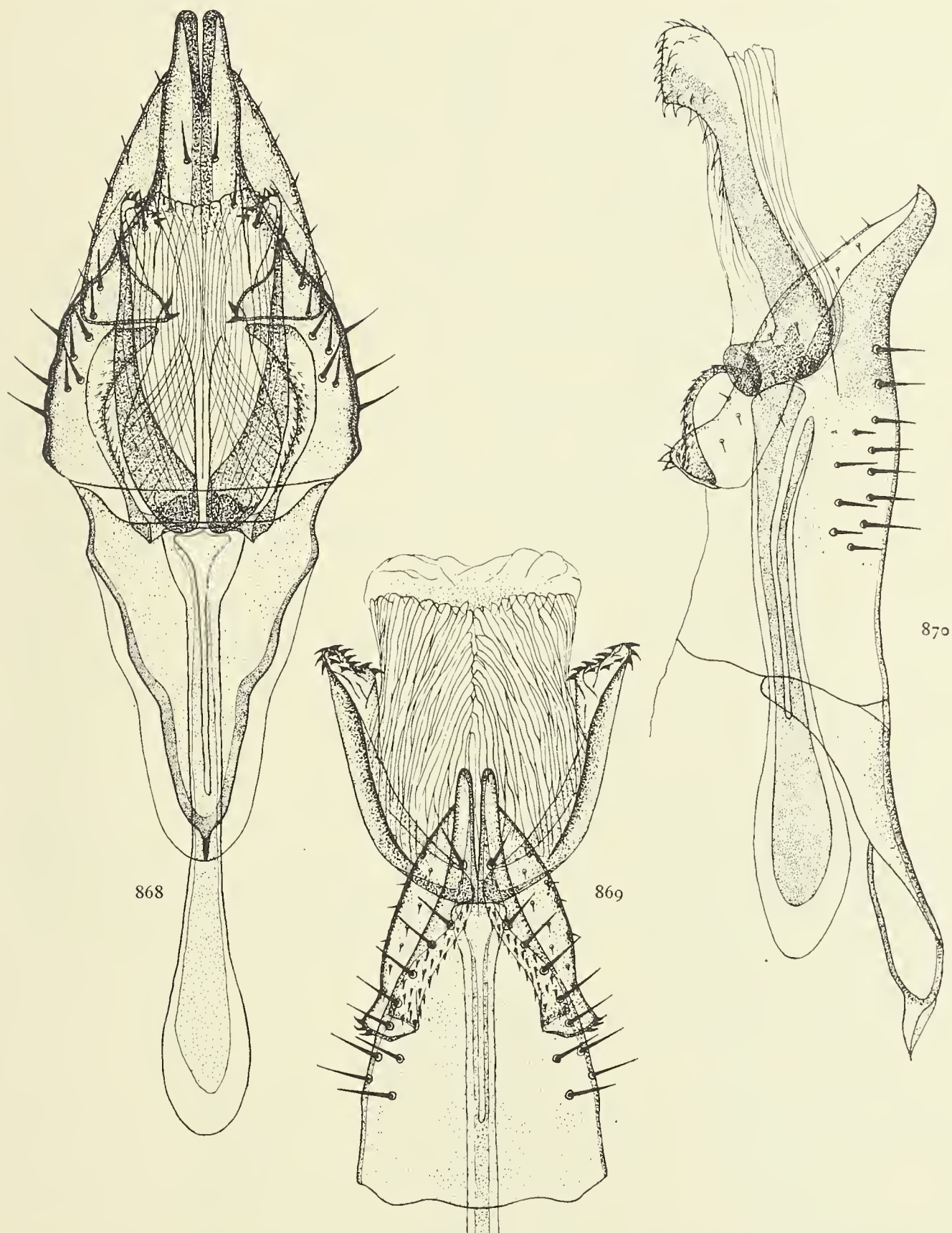
*Genitalia.* Claspers long and slender, parallel-sided in the basal three-quarters and tapering to a short, blunt tip in the apical quarter. One long and 2 or 3 short setae near the base and a row of minute spines in the apical part on the dorsal surface. A row of 8–10 short, thick spines on the ventral surface in the apical quarter. These spines are thick and curved near the tip and become gradually longer and thinner towards the base. Basal arc triangular. Basal plate very long and narrow, wider and with a deep concavity anteriorly. Phallobase triangular, with a bifid, slightly hooked tip and an irregular double row of spines along the outer margin. The parameres are fused with the phallobase and have a posterior process with curved spines. The aedeagus is sclerotized laterally and membranous in its median part. The lateral arms are able to spread sideways. They are wider apically and bear some backwardly directed spines ventrally near the tip. The median part of the aedeagus is apparently a form of endophallus which can be protruded for a short distance. Protrusion of the aedeagus is restricted by a tendon covered with minute spines which originates on the posterior part of the parameres and is inserted at the base of the aedeagus. Apodeme long and slender, with a narrow end plate.

*Female abdomen.* Tergite 2 with a marginal row of setae which are longer than in the male and with a premarginal row as in the male. Dorsum of the abdomen covered with short spines. These are longer in some rows which may mark the posterior margins of tergites. Tergite 6 small, elliptical or triangular, with 3–5 long setae at the posterior margin. Surface bare. Anal segment short, conical, with a row of long setae around the anus and 2 setae ventrally. Sternite 1 + 2 as in the male. Venter covered with short spines on sclerotized bases which are longer posteriorly. Sternite 5 with small, crescent-shaped sclerites with 2 long and 2 shorter vertical setae at the hind margin. Sternite 6 with larger, triangular lateral sclerites with a similar arrangement of setae. Sternite 7 consisting of triangular lateral sclerites with longer setae posteriorly. Anal sclerite strip-like, with 2 setae posteriorly.





Figs. 865-867. *Cyclopodia ferrarii* (Rondani). Female. 865. abdomen, dorsal; 866. same, ventral; 867. *C. ferrarii palawanensis*, female abdomen, dorsal.



Figs. 868–870. *Cyclopodia ferrarii* (Rondani). Male genitalia. 868. dorsal, aedeagus retracted; 869. same, aedeagus extended; 870. lateral, aedeagus extended.

Distribution and hosts: Java (type locality). India, Ceylon, Burma, Thailand, Malaya and Sumatra. Mainly on species of *Cynopterus*, rarely stragglers on insectivorous bats. See Map 4.

## MATERIAL IN THE COLLECTION

## INDIA

Vijayanagar, Bellary, from *Megaderma lyra*, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).  
Madras, from *Cynopterus sphinx*, 1 ♀.  
Calcutta, Museum building, from bat no. 10015, 25.xi. 1914, ex coll. Indian Museum, 1♂ 1 ♀.

Kosgolla, Tonacombe, Namunukula, Uva Hills, from *Cynopterus sphinx*, 14.iv. 1956, W. W. A. Phillips, 1 ♂ 1 ♀.

## THAILAND

Bangkok, from *Cynopterus sphinx*, Oct. 1916, C. Boden Kloss, 1 ♀ (Brit. Mus. 1917.43).

## CEYLON

Peradeniya, H. H. W. Pearson, 1 ♂ 1 ♀.  
Peradeniya, from *Cynopterus brachyotis ceylonensis*, Nov. 1911, Mar. 1912, J. C. F. Fryer, 1 ♂ 1 ♀.  
Urugala, Central Prov., from bat, 7.i. 1914, E. W. Mayor, N. C. Rothschild, 8 ♂ 3 ♀.  
Kala Oya, N.W.P., from 'Pangolin', 14.v. 1914, E. W. Mayor, N. C. Rothschild, 2 ♂ 1 ♀ (straggler).  
St George, Matugama, Kalutara, from *Cynopterus sphinx*, 9.i. 1923, W. W. A. Phillips, 2 ♂.  
Gonagama, Kitulgala, from *Cynopterus brachyotis ceylonensis*, 12.vi. 1925, W. W. A. Phillips, 1 ♂.  
Kosgolla, Tonacombe, Namunukula, Uva Hills, from *Cynopterus brachyotis ceylonensis*, 7.viii. 1955, W. W. A. Phillips, 3 ♂ 4 ♀.

## MALAYA

South Perak from *Cynopterus brachyotis angulatus*, H. C. Robson, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).

## SUMATRA

Krapoh Deli, Bedagri, from *Cynopterus brachyotis angulatus*, M. Kannegruber, N. C. Rothschild, 1 ♂ (Brit. Mus. 1913.450).  
Balige, Oct. 1890–Mar. 1891, E. Modigliani, 1 ♂ 1 ♀.

## JAVA

From *Cynopterus horsfieldi*, W. E. Balston & G. C. Shortridge, N. C. Rothschild, 1 ♀ (Brit. Mus. 1913.450).

## HOST SYNONYMY

Name on original label  
*Cynopterus marginatus* Geoffroy.

Current name  
*C. sphinx* Vahl.

**Cyclopodia (Leptocyclopodia) ferrarii palawanensis** Theodor, 1959

(Figs. 858, 867, 873, 876)

*Cyclopodia ferrarii palawanensis*. Theodor, 1959, *Parasitology*, **49**, 242.

*Cyclopodia ferrarii palawanensis* Theodor. Theodor, 1963, *Feldiana Zool.* **42**, 151.

The subspecies differs from the typical form in the presence of rows of longer setae in the posterior rows of the segments on the dorsum of the female, particularly marked in the marginal rows of tergites 3 and 5. In the male, phallobase and parameres are of different shape. The anterior hook of the phallobase is stouter and more strongly curved upwards. The parameres are longer and less strongly concave ventrally. The spines on the ventral surface of the claspers are thicker.

Type series in the Chicago Natural History Museum.

## MATERIAL IN THE COLLECTION

## PHILIPPINES

Puerto Princesa, Palawan Island, from *Cynopterus brachyotis luzoniensis*, 3.iv. 1947, F. Werner, 2 ♂ 2 ♀ paratypes

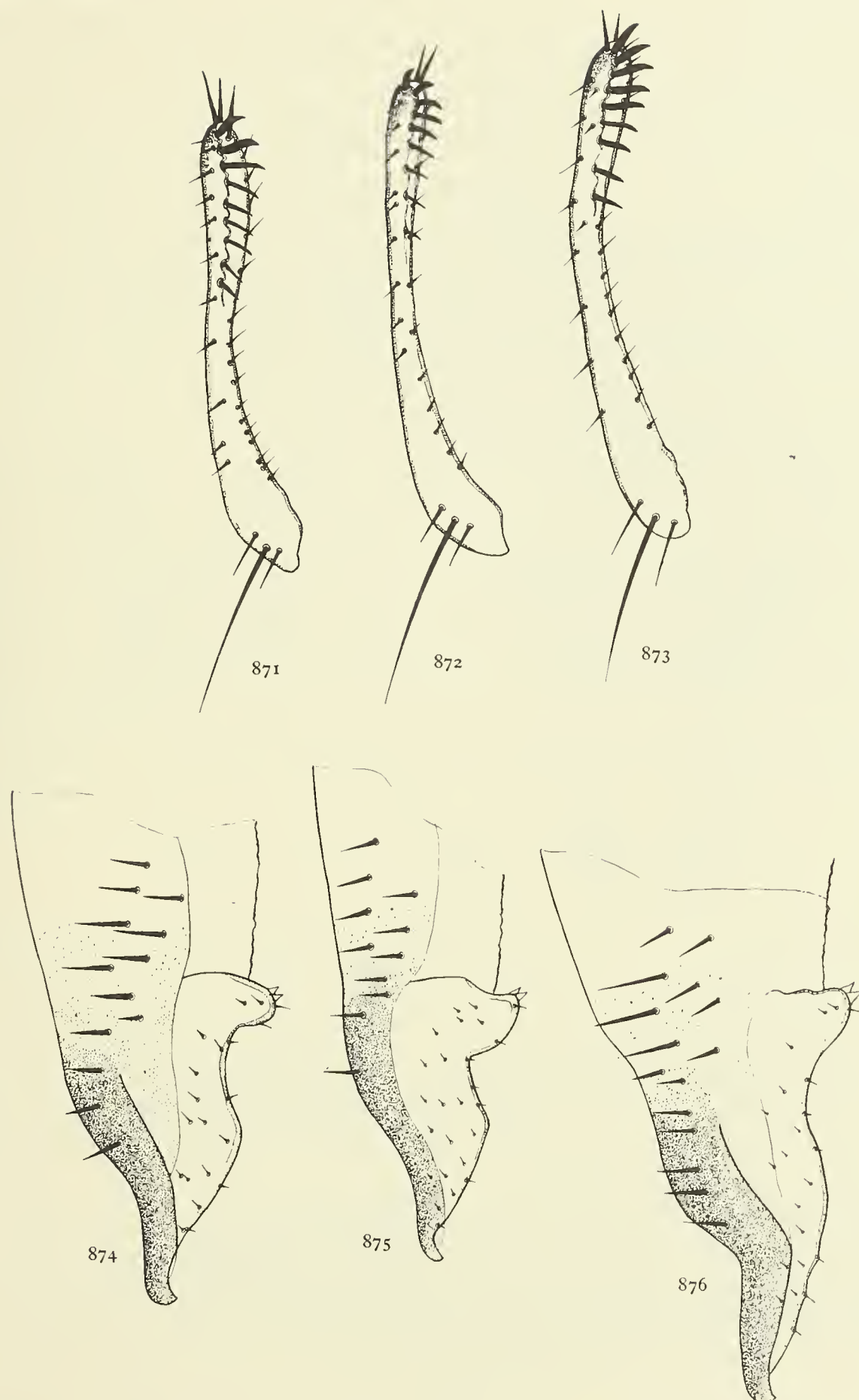
**Cyclopodia (Leptocyclopodia) brachythrinx** Theodor, 1959

(Figs. 859, 877–880)

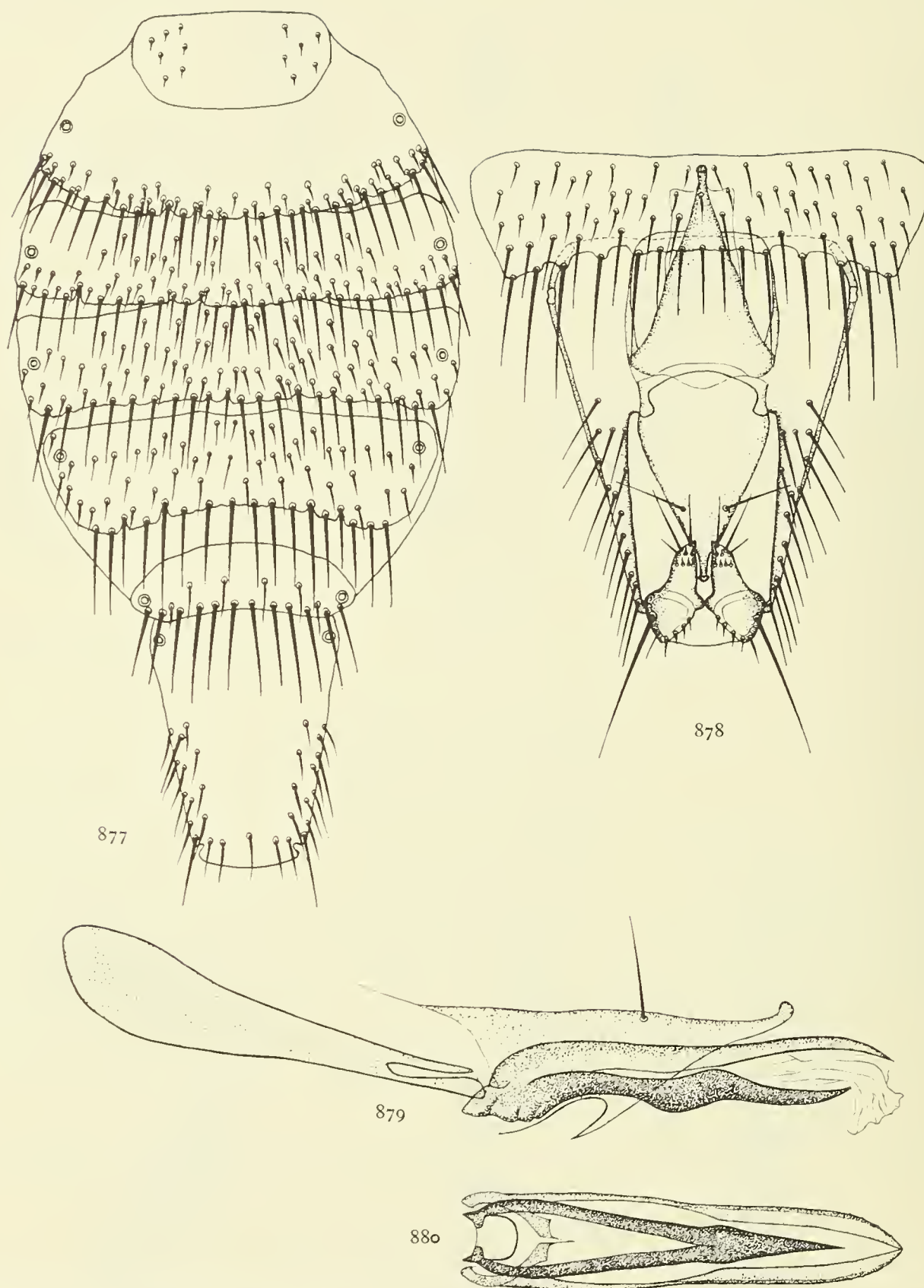
*Cyclopodia brachythrinx*. Theodor, 1959, *Parasitology*, **49**, 242.

Length 2.5 mm. Colour yellowish brown.





Figs. 871-876. *Cyclopodia ferrarii* (Rondani). Male genitalia. Clasper of specimen from: 871. Java; 872. Ceylon; 873. of *C. ferrarii palawanensis*; phallobase, lateral, of specimens from: 874. Java; 875. Ceylon; 876. of *C. ferrarii palawanensis*.



Figs. 877-880. *Cyclopodia brachythrinx* Theodor. Male. 877. abdomen, dorsal; 878. sternite 5 and genital area; 879. genitalia; 880. aedeagus, dorsal.

*Head.* Vertex bare, 4 setae at the anterior dorsal margin. Eyes with incompletely divided lenses. Labella of the proboscis slightly longer than the theca.

*Thorax.* Slightly wider than long, rounded anteriorly. Ctenidium with about 16 blunt spines. One longer and one shorter notopleural seta. A dense row of short spines near the posterior margin of the sternal plate and 3 longer setae at each side. Angle of oblique sutures about 90°. Legs short, all 3 legs of about equal length.

*Male abdomen.* Post-spiracular sclerite with 1–2 short spines. 2 groups of 7 minute spines on tergite 1. Tergite 2 with a marginal row of moderately long setae and a double premarginal row on the surface. Tergites 3–5 short, of about equal length, with marginal rows of moderately long setae and short setae on the surface. The lateral setae on tergite 5 longer. Tergite 6 shorter and narrower, with a (?) similar marginal row (setae missing), and 4–5 short setae on the surface. Anal segment slender, tapering, slightly less than twice as long as wide at the base. Short setae at the lateral posterior part of the surface. Abdominal ctenidium with 42 thick spines. Sternites 3–5 of about equal length with moderately long marginal setae and short setae on the surface.

*Genitalia.* Claspers rudimentary, very short, with 2 longer setae at the tip and a few short spines further basally. A long seta dorsally near the base. Basal arc triangular, with an apical knob. Phallobase also with an apical knob and 2 setae at the sides. Aedeagus long, sclerotized ventrally and dorsally at the sides and membranous in the middle of the dorsal surface and at the sides. The ventral part is narrowly triangular in dorsal view. The dorsal ridges are more weakly sclerotized and end in 2 points. Apodeme as long as the aedeagus, with a moderately wide end-plate. Parameres apparently completely fused with the phallobase, indicated by a few minute hairs at the ventral margin.

Female unknown.

Distribution: North Borneo. Mt Kinabalu, male holotype in the Chicago Natural History Museum.

### ***Cyclopodia (Leptocyclopodia) macrura* Speiser, 1900\***

(Figs. 881–885)

*Cyclopodia macrura.* Speiser, 1900, *Entom. Nachr.* **26**, 292.

*Cyclopodia macrura* Speiser. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

*Cyclopodia macrura* Speiser. Theodor, 1959, *Parasitology*, **49**, 242.

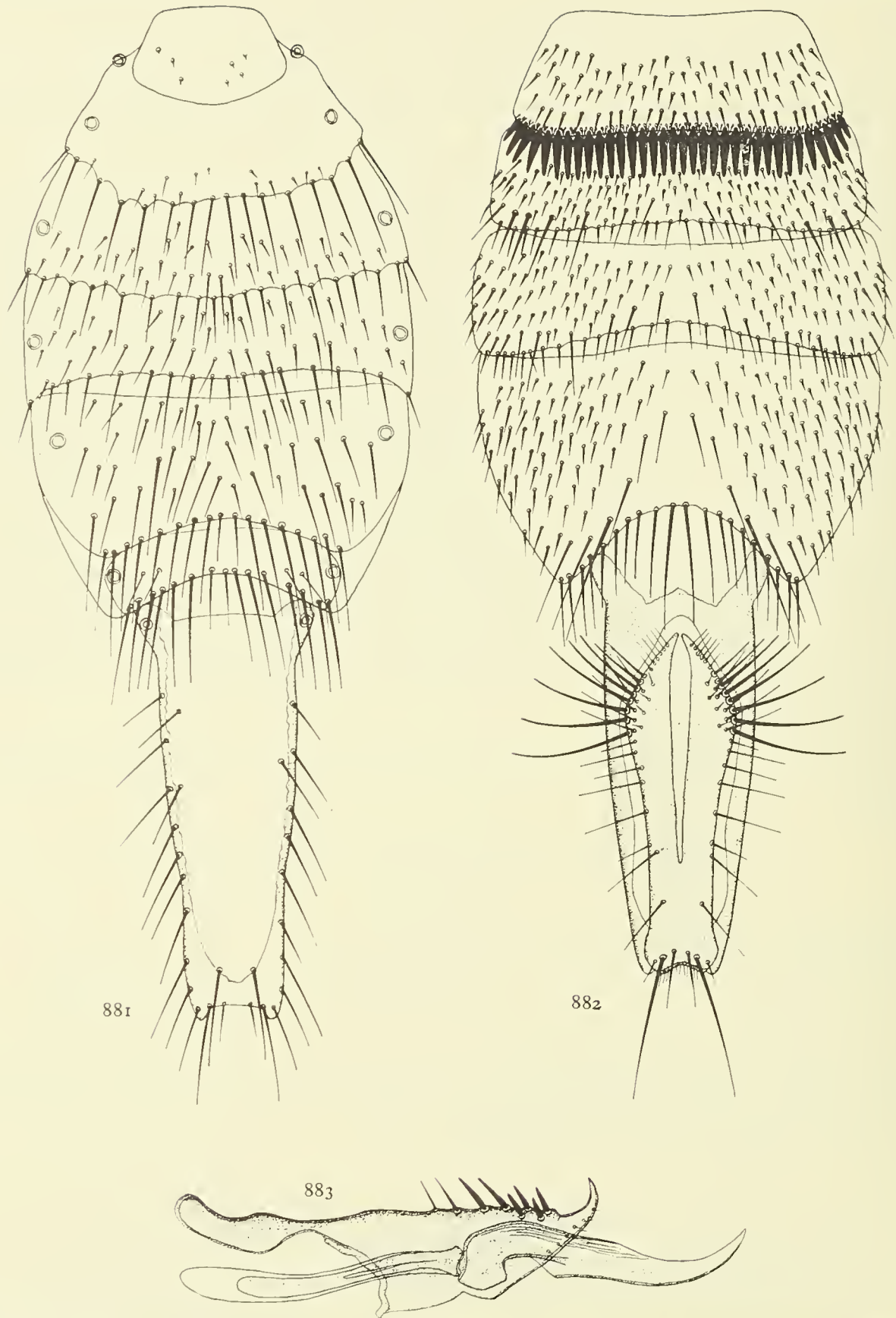
Length: female 3.5–4 mm.; male 4.5–5 mm., of which the anal segment is 1.25–1.5 mm. Colour brown.

*Head.* Vertex bare. 4–5 setae at the anterior dorsal margin. Eyes with deeply separated, large lenses. Palps long and slender, with long terminal seta. Labella of the proboscis nearly twice as long as the theca.

*Thorax.* Angle of the oblique sutures about 90°. Thoracic ctenidium with about 12 thick, blunt spines. Haltere groove open. 2–3 notopleural setae. Legs long. Fore-coxae cone-shaped,

\* Fig. 884 is drawn from a specimen from Sumbawa. Specimens from the type locality examined recently constantly show a larger number of setae in the groups on the connexivum and specimens from New Guinea an even larger number. The specimens from Sumbawa will probably prove to belong to a subspecies and the specimens from New Guinea possibly to another subspecies. The setae on the marginal rows of sternite 3 and 4 of the male in Fig. 882 are shown too long and thin. They are, in fact, shorter and much thicker spines in the specimens from the type locality.





Figs. 881-883. *Cyclopodia macrura* Speiser. Male. 881. abdomen, dorsal; 882. same, ventral; 883. genitalia.

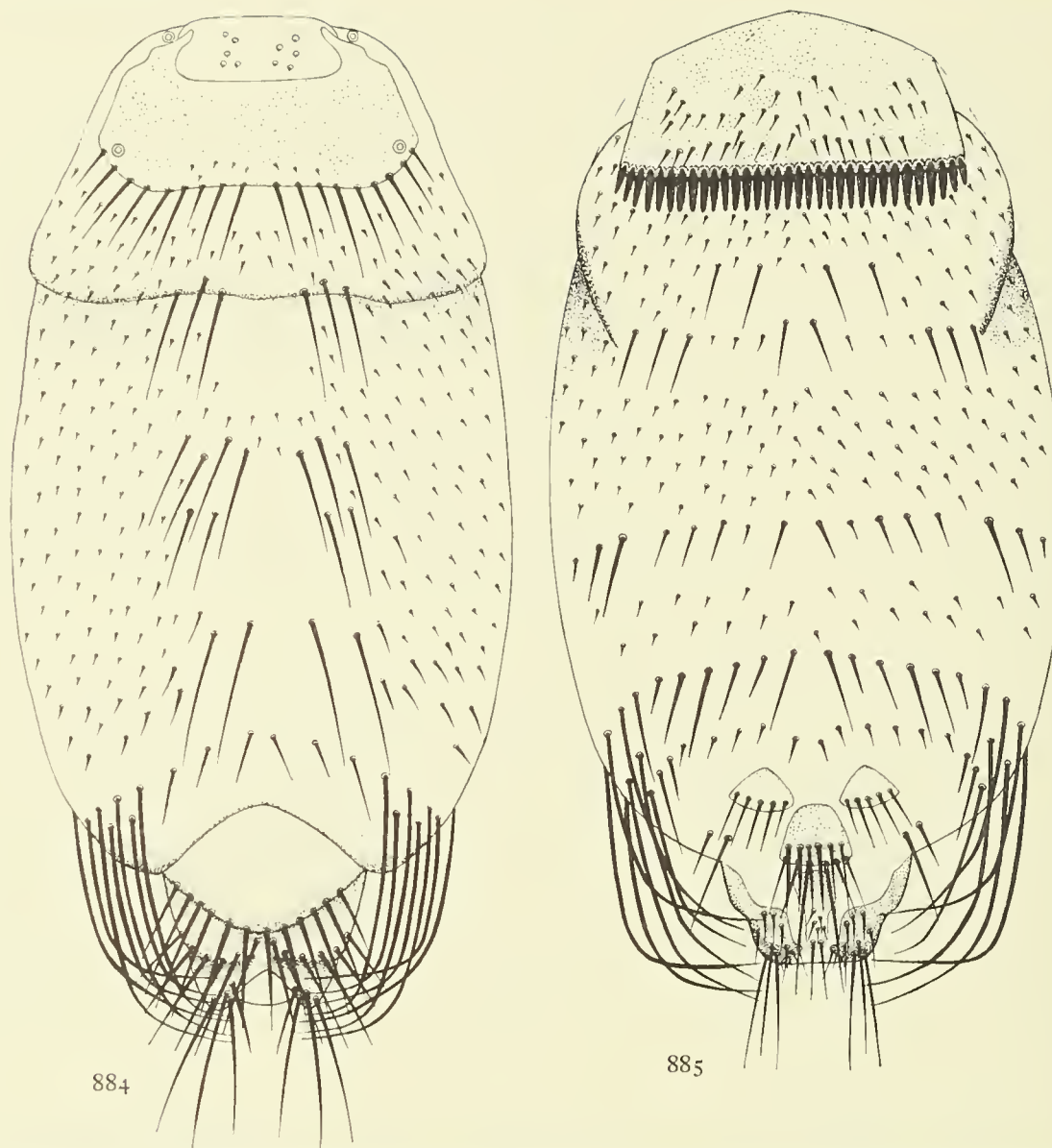
two-thirds of the length of the femur. Tibiae cylindrical, slightly compressed laterally, 5–6 times as long as wide, with 3 rings in the middle, of which the apical ring is farther away from the middle ring than the basal one. Tarsi about as long as the tibiae.

*Male abdomen.* 2 groups of 3–4 minute spines on tergite 1. Tergite 2 with a uniform marginal row of widely spaced, thick, moderately long setae. A premarginal row of short spines on the surface. Tergites 3 and 4 with similar marginal rows and short spines on the surface. Tergite 5 as long as tergites 3 and 4 together, narrower posteriorly, with a marginal row of longer setae and with longer setae posteriorly and shorter setae anteriorly on the surface. Tergite 6 very short, strip-like, with a concave posterior margin which bears 16 long setae. Anal segment very long and slender, nearly cylindrical, about 3–4 times as long as wide at the base. Dorsal surface bare, except for 2 long setae near the posterior margin and a few others at the sides. 2 long and 2 short setae at the posterior margin. Abdominal ctenidium with about 30 thick, blunt spines. Sternites 3 and 4 with marginal rows of spines and with short spines and a premarginal row of longer setae on the surface. Sternite 5 as long as sternites 3 and 4 together, narrowing posteriorly, with a deeply concave posterior margin which bears a row of setae. There is a V-shaped row of setae in the posterior part of the surface.

*Genitalia.* Claspers fused at the base, nearly parallel-sided in the basal two-thirds, widening in the apical third and then tapering to a short point. The lateral margin of the wide apical part bears a row of about 8 blunt setae which become gradually shorter towards the tip. The longest basal seta is placed at about the apical quarter. 2 long and 4 short setae dorsally near the base and short setae along the sides. Basal arc with long rounded anterior process, fused with the phallobase. Basal plate long, rectangular, with a deep anterior concavity. Phallobase triangular, with bifid apex terminating in curved upturned ends. A double row of 8 long, thick spines in each half of the phallobase. Aedeagus sclerotized, broad basally, tapering to a fine point, curved, with a deep indentation ventrally near the base. Apodeme slender, about as long as the aedeagus.

*Female abdomen.* Tergite 1 + 2 longer than in the male, with a marginal row of moderately long, uniformly spaced setae with a gap in the middle. Dorsum of abdomen with 3 groups of setae in each half which apparently indicate the posterior margins of the tergites. The dorsum is covered with short spines except in some median areas between the long setae. The posterior margin of tergite 5 is indicated by a row of shorter setae in the middle and very long setae laterally which are curved towards the abdomen. Tergite 6 with a triangular sclerite with a row of long setae posteriorly. 1 or 2 rows of long curved setae at the sides of the tergite which together with the marginal setae of tergite 5 form a thick brush. Anal segment short, truncate, with a curved row on the dorsal surface and long setae posteriorly. Abdominal ctenidium with 35 thick spines. Sternites 3–5 with marginal rows of longer setae and short spines on the surface. Sternite 6 with small, triangular lateral sclerites with long setae posteriorly. Sternite 7 with a square or trapezoidal sclerite with 2 long and several shorter setae posteriorly, and a premarginal row of shorter setae. Anal sclerite triangular, with 2 setae posteriorly.

Distribution and host: New Guinea, New Britain, Sumbawa, from *Dobsonia peroni*.



Figs. 884, 885. *Cyclopodia macrura* Speiser. Female. 884. abdomen, dorsal; 885. same, ventral.

#### OTHER MATERIAL EXAMINED

NEW GUINEA  
Bulolo, from *Dobsonia* sp., 1 ♀.

SUMBAWA  
Wawo, 1 ♂ 1 ♀.

#### *Cyclopodia (Leptocyclopodia) obliqua* Theodor, 1959

(Figs. 886–892)

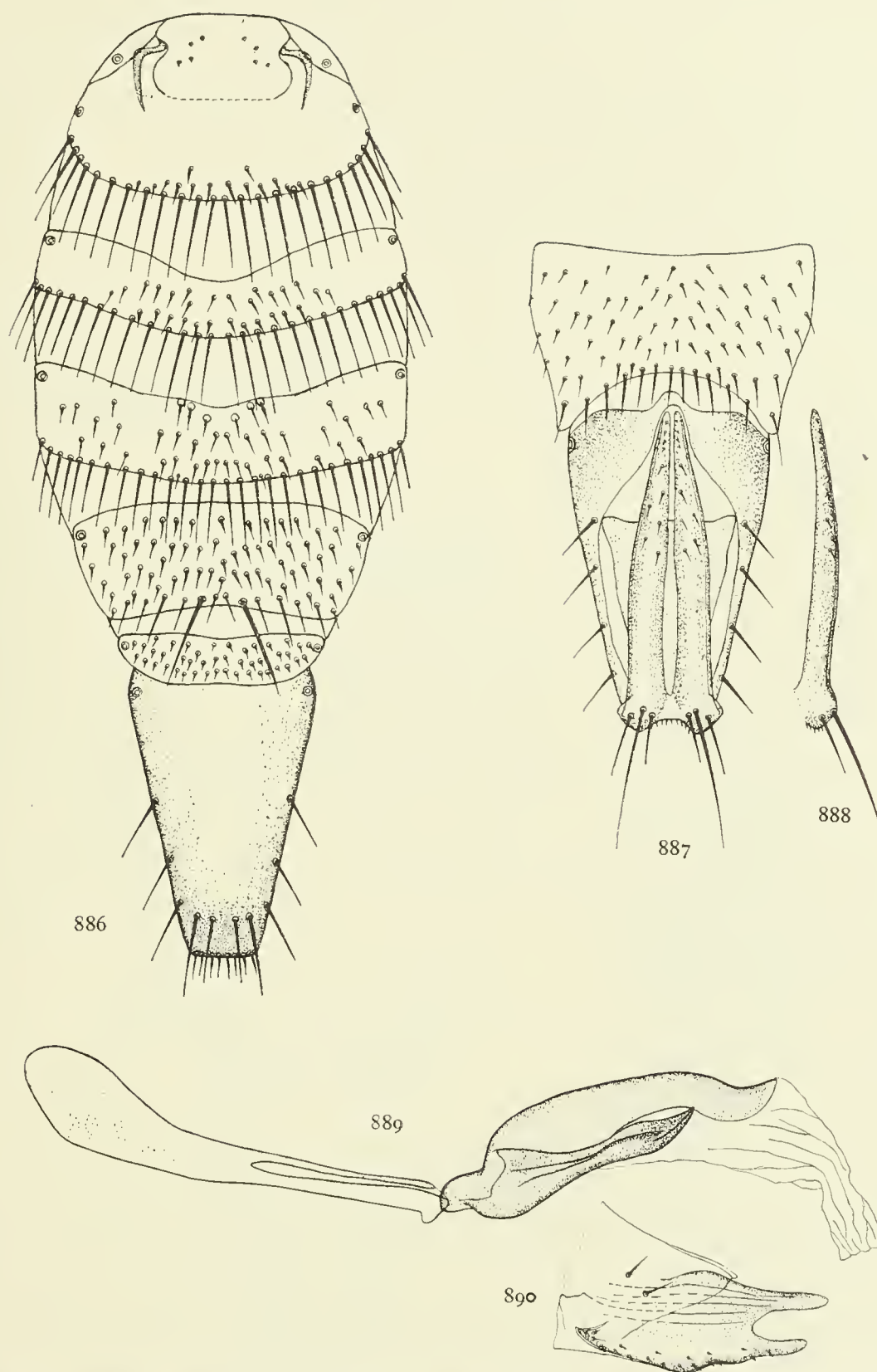
*Cyclopodia obliqua*. Theodor, 1959, *Parasitology*, **49**, 242.

Length 2.5 mm. Colour brown.

*Head*. Vertex bare. 2 setae at the anterior dorsal margin. Eyes with incompletely separated lenses. Palps with wide base and tapering towards the tip. Labella of the proboscis about half as long as the theca.

*Thorax*. As long as wide, triangular, narrow between the ctenidia which have about 15 slender

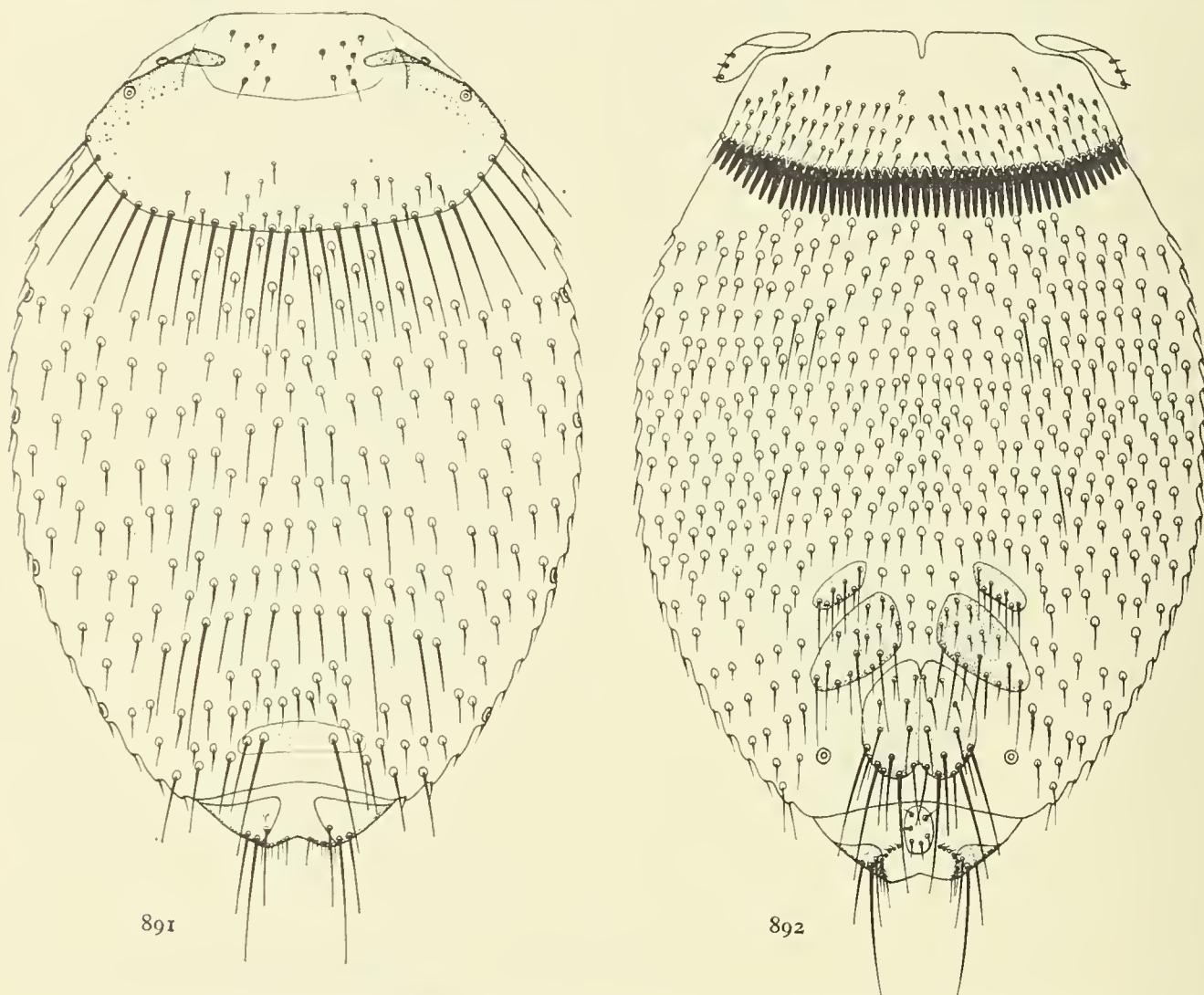




Figs. 886-890. *Cyclopodia obliqua* Theodor. Male. 886. abdomen, dorsal; 887. sternite 5 and genital area; 888. clasper, lateral; 889. genitalia, lateral; 890. paramere.

spines with blunt ends. Angle of oblique sutures about  $80^\circ$ . 4-5 notopleural setae in a row. Legs shorter than in *C. ferrarii* (2.4-2.6 mm.). Fore-coxae three-fifths of the length of the femur.

*Male abdomen.* Post-spiracular sclerite with 1-3 short spines. Tergite 2 with a uniform marginal row of moderately long setae and a premarginal row of short spines. Tergites 3 and 4 shorter than in *C. ferrarii* and with shorter and more numerous spines on the surface. Tergite 5 longer, its surface covered with short spines and with a marginal row of short setae and 2 long



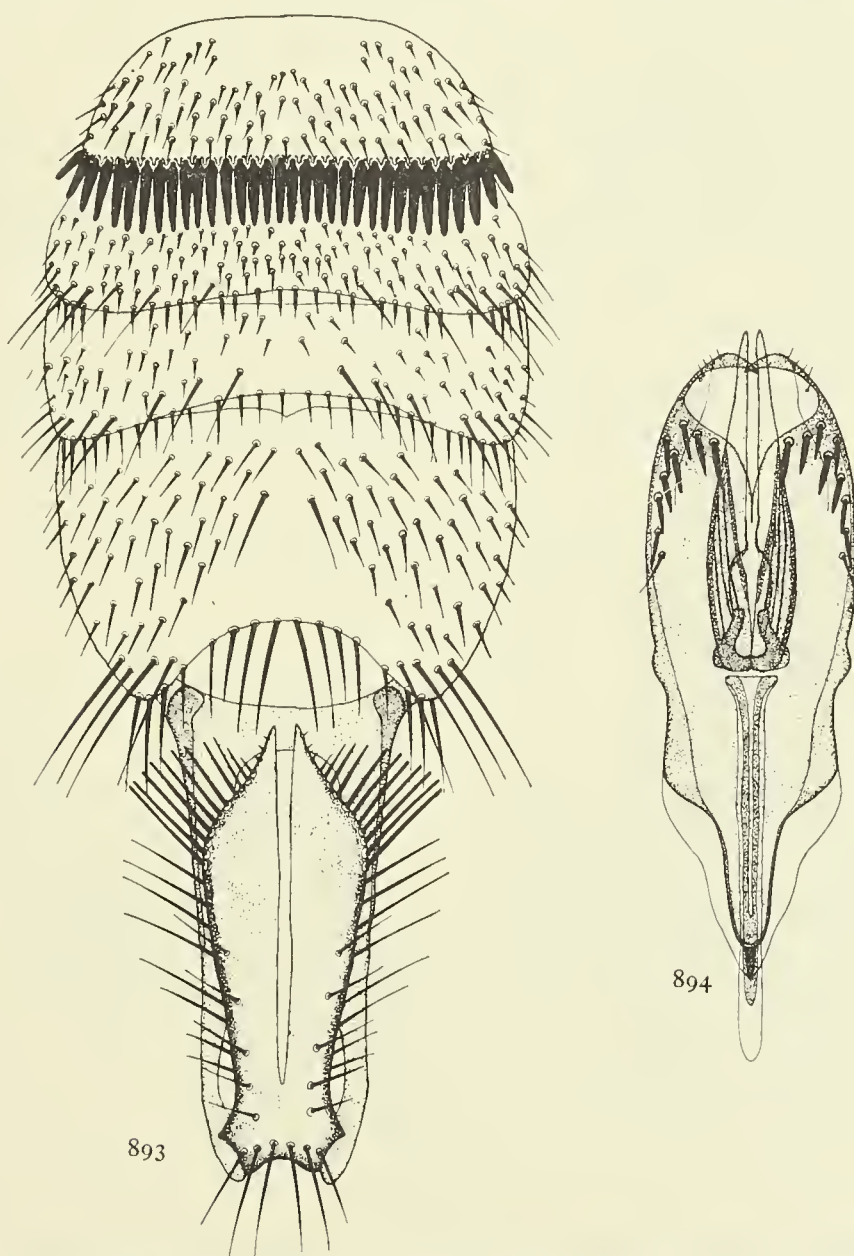
Figs. 891, 892. *Cyclopodia obliqua* Theodor. Female. 891. abdomen, dorsal; 892. same, ventral.

setae in the middle. Tergite 6 very short and narrower than tergite 5, without any marginal setae and with minute spines on the surface. Anal segment slender, conical, shorter than in *C. ferrarii*, nearly twice as long as wide at the base. A row of 4 setae on the posterior part of the surface, a few setae at the lateral margins and about 8 short setae at the posterior margin. Abdominal ctenidium with 42 spines. Sternite 5 concave posteriorly with a marginal row of short setae and a premarginal row of similar setae.

*Genitalia.* Claspers slender, tapering to a blunt tip in the apical half. 1 long and 2 shorter setae dorsally near the base. The row of spines at the apex of the clasper, characteristic of

*C. ferrarii*, is absent. Basal arc triangular. Basal plate also triangular, but shorter and broader than in *C. ferrarii*. Phallobase fused with the basal arc, with 2 setae at each side. Parameres broad, with 2 long apical processes and a deep concavity between them. Aedeagus sclerotized ventrally in 2 pointed lateral ridges and dorsally. It possesses an endophallus the exact form of which could not be made out.

*Female abdomen.* Tergite 1 with 2 groups of 7 minute spines. Tergite 2 rounded posteriorly with a uniform marginal row of moderately long setae and some short spines on the surface posteriorly. Dorsum covered with short spines anteriorly and much longer spines posteriorly. 4 longer setae in the marginal row of tergite 5. Tergite 6 small, elliptical, with 2 longer and 2 shorter setae. Anal segment very short. Abdominal ctenidium with about 50 spines. Venter covered with short spines. Sternite 5 with 2 small, elliptical, obliquely placed sclerites with 2 rows of short setae. Sternite 6 similar, but the sclerites are larger and reach close to the mid-



Figs. 893, 894. *Cyclopodia orthotricha* Theodor. Male. 893. abdomen, ventral; 894. male genitalia, dorsal.



line. Sternite 7 consisting of 2 elliptical sclerites which touch in the median line, with several long setae posteriorly and short setae on the surface. Anal sclerite elliptical, with 6 short setae.

MALAYA. Kepong, from *Balionycteris maculata*, R. Traub, male holotype, female paratype in the Chicago Natural History Museum.

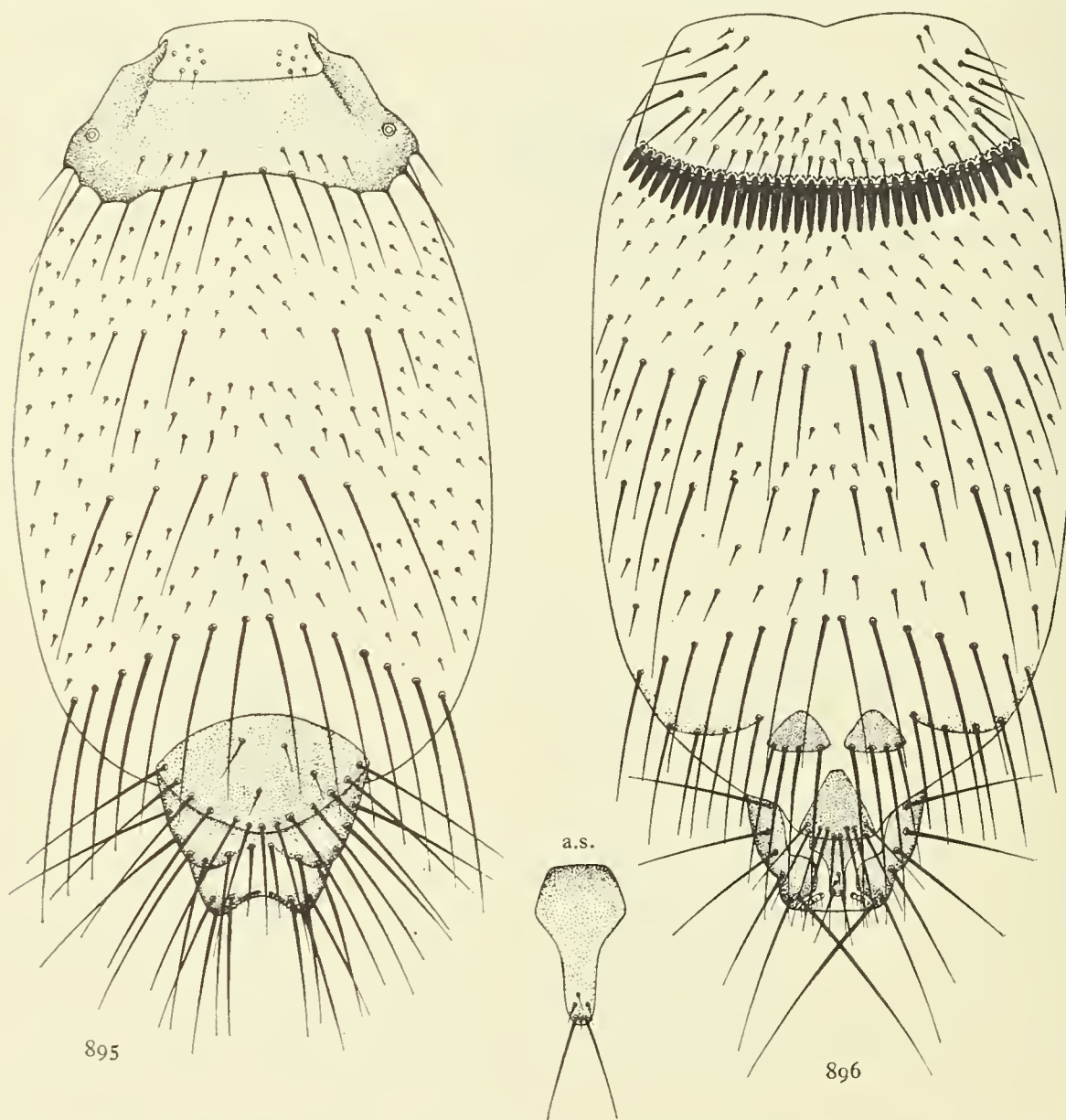
***Cyclopodia (Leptocyclopodia) orthotricha* Theodor, 1959**

(Figs. 893-896)

*Cyclopodia orthotricha*. Theodor, 1959, *Parasitology*, **49**, 242.

This species is closely related to *C. macrura*, but differs from it in its smaller size and in details of chaetotaxy.

Length of female: 3-3.5 mm.; male: 3.5 mm., of which 1 mm. is the anal segment.



Figs. 895, 896. *Cyclopodia orthotricha* Theodor. Female. 895. abdomen, dorsal; 896. same, ventral, with anal sclerite.

Head as in *C. macrura*. The anterior ventral margin is more strongly curved, forming nearly a right angle. Thorax and legs as in *C. macrura*.

*Male abdomen.* Only the differences from *C. macrura* will be noted. The posterior spines on tergite 1 are much longer than the anterior ones. Tergite 6 is bare on the surface and has only 12 marginal setae. The anal segment is shorter, only twice as long as wide at the base in mounted specimens and 3 times in specimens in alcohol. The claspers are wider near the tip and widen gradually from the base. The setae near the tip are shorter and have truncated tips. The basal seta is placed at about the apical third of the clasper.

*Female abdomen.* The chaetotaxy differs markedly from that of *C. macrura*. The whole dorsal surface is covered with short spines without any bare median areas. The long setae are arranged in 3 transverse rows. There are only 2–3 long setae in the marginal row of tergite 3 and 6 such setae in the marginal row of tergite 4. The marginal row of tergite 5 consists of long setae which extend across the abdomen on to the pleurae, but the lateral setae are straight, not curved as in *C. macrura*. The median setae are as long as the lateral ones. The surface of tergite 6 is bare laterally, but there are a few short spines on the sclerite in the middle. The row of short setae which is present in *C. macrura* anterior to the sclerites of sternite 6 is absent. Sternite 7 is triangular and has only a single row of setae posteriorly and 2 setae in the lateral corners.

#### MATERIAL IN THE COLLECTION

##### SOLOMON ISLANDS

Fatura, Santa Isabel Island, from *Dobsonia inermis*, Mar. 1932, R. J. A. Lever, ♂ holotype, 1 ♂ 3 ♀ paratypes (Brit. Mus. 1939.338).

Teabagua Caves, Rennell Island, from *Dobsonia inermis*, 12.xi. 1953, J. D. Bradley, 3 ♂ 1 ♀.

Lavangu, Rennell Island, from bat no. 391, 6.xi. 1951, Galathea Expedition, 2 ♂ 1 ♀.

#### *Cyclopodia (Leptocyclopodia) simulans* Theodor, 1959

(Figs. 897, 898)

*Cyclopodia simulans.* Theodor, 1959, *Parasitology*, **49**, 242.

*Cyclopodia simulans.* Theodor, 1963, *Feldiana*, Zool. **42**, 151.

Length 3 mm. Colour yellowish brown.

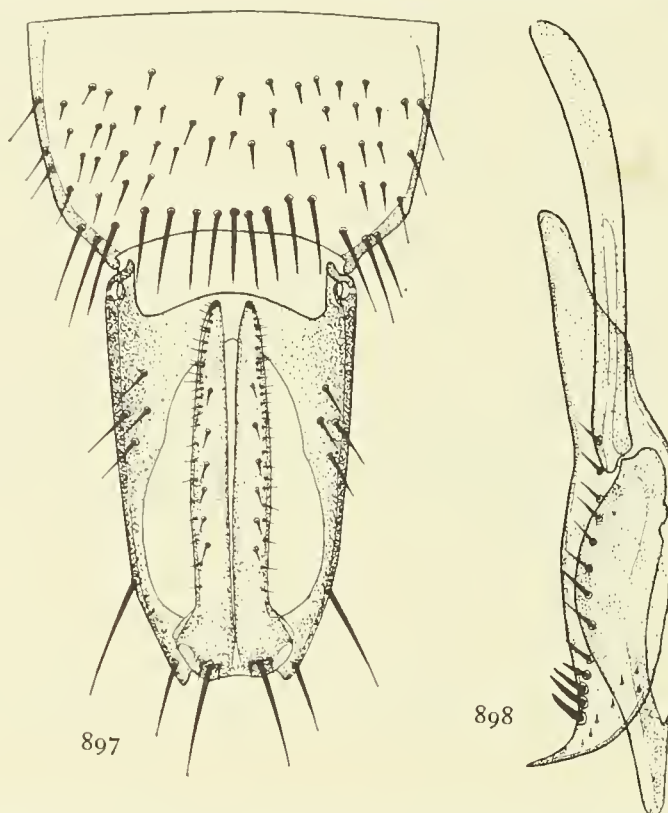
*Head.* Vertex bare. 2 long setae at the anterior dorsal margin. Eyes with incompletely separated, large lenses on a shallow pigmented base. Palps with a wide base tapering towards the tip. Labella of the proboscis slightly longer than the theca.

*Thorax.* Two notopleural setae. Angle of the oblique sutures 90°. Otherwise resembling *C. ferrarii*. Legs shorter than in *C. ferrarii*. Leg 1 = 2.2 mm., legs 2 and 3 = 2.4 mm. long. Basitarsi about 0.56 mm. long, of equal length in all 3 legs (0.65–0.85 in *C. ferrarii*).

*Male abdomen.* Very similar to that of *C. ferrarii*. Post-spiracular sclerite without spines. There is a double row of about 18 short spines on the surface of tergite 2 near the marginal row. Anal segment slender, tapering slightly, twice as long as wide at the base. Some short setae in the lateral posterior part of the surface, a transverse row of longer setae near the hind margin and a row of 8 short setae at the posterior margin.

*Genitalia.* Claspers slender, tapering to a blunt point. A long and 2 short setae dorsally near the base. A row of minute hairs along the outer edge and a row of short spines on the dorsal

surface. The row of spines near the tip on the ventral surface which is characteristic of *C. ferrarii* is absent. Phallobase bifid apically, with upturned ends and a row of spines along the outer edge. Basal arc triangular, fused with the phallobase. Parameres fused with the phallobase, with 2 rows of minute spines. Aedeagus wholly sclerotized, curved, tapering to a rounded end and with a small ventral tooth near the tip. Apodeme as long as the aedeagus.



Figs. 897, 898. *Cyclopodia simulans* Theodor. Male. 897. sternite 5 and genital area; 898. genitalia.

Female unknown.

Distribution and host: Philippines, Mindanao, from *Ptenochirus jagori*, male holotype in the Chicago Natural History Museum.

#### INSUFFICIENTLY DESCRIBED SPECIES

##### **Nycteribia dispar** Speiser, 1901

*Nycteribia dispar*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

The male and female described clearly belong to different species. The male is related to the species described here as *Basilina* (*Conotibia*) *compar*, while the female is probably that of *Basilina* (*Tripselia*) *hirsuta* or *Basilina* (*Tripselia*) *horrida*, both of which occur in New Guinea.

##### **Nycteribia elongata** Rudow, 1871

*Nycteribia elongata*. Rudow, 1871, *Zeitschr. ges. Naturwiss.* **3**, 121.

*Nycteribia elongata* Rudow. Speiser, 1902, *Zeitschr. syst. Hym. Dipt.* **2**, 145.

Speiser examined the specimen, a male from *Nyctophilus geoffroyi*, without locality. He mentions the size, 1.5 mm., the broad tibiae and the angulate claspers and that the posterior



#### INSUFFICIENTLY DESCRIBED SPECIES

margin of sternite 5 is without spines, but only with a marginal row of longer and shorter setae. This is thus clearly a species of the *parilis* group, but it is not possible to say which of the 6 species known at present.

#### **Acrocholidia nipponensis** Kishida, 1932 (male)

#### **Stylidia tarsalis** Kishida, 1932 (female)

*Icon. Insect. Japon.*, Tokyo.

Both these species are probably male and female of a *Stylidia*, perhaps *Stylidia hindlei* which occurs in Japan.

#### **Penicillidia peali** Scott, 1925

*Penicillidia peali*. Scott, 1925, *Rec. Ind. Mus.* **27**, 351.

This is clearly a *Basilia* of the *bathybothyra* group. Scott mentions its resemblance to *Basilia fletcheri*. The arrangement of the setae on tergite 1 resembles that in *B. punctata*, but Scott states: 'Connexivum behind tergite 2 and at the sides bare,' that is, there is no tergal plate 3. As the specimen was shrunk, it is possible that tergal plate 3 was covered by tergite 2 and was overlooked. If it should prove correct, that tergal plate 3 is absent, this would be the only Old World species of *Basilia* without tergal plate 3. The unique type is unfortunately lost and the question of the identity of this species must be left open until more material becomes available.

Distribution: Assam, without host or date.

#### **Listropodia pygmaea** Kishida, 1932

*Listropodia pygmaea*. Kishida, 1932, *Icon. Insect. Japon.*, Tokyo.

This is probably the female of *Nycteribia parvula*.

#### **Nycteribia stichotricha** Speiser, 1901

*Nycteribia stichotricha*. Speiser, 1901, *Arch. Naturgesch.* **67**, 11.

Not recognizable.

#### **Nycteribia varipes** Rudow, 1871

*Nycteribia varipes*. Rudow, 1871, *Zeitschr. ges. Naturwiss.* **3**, 121.

Not recognizable.

#### **Cyclopodia novaguineae** Schuurmans Stekhoven, 1959

*Cyclopodia novaguineae*. Schuurmans Stekhoven, 1959, *Deutsche Entom. Zeitschr.* (N.F.), **6**, 260.

This species belongs to the *sykesii* group of the subgenus *Cyclopodia* s.str. It seems related to *C. albertsii*, but its definite position can only be determined by examination of material.

Distribution: New Guinea.



# INDEX

Synonyms and misdeterminations are in italics. The principal reference to each valid name is in bold type. Names mentioned only in the introduction, or to which there is only a casual reference in the text are omitted, as are page references to names in legends to figures.

- Acrocholidia, 43, 51, 53, **112**  
 actedona, Penicillidia, 45, 335, 358, **379**  
 actena, Archinycteribia, 46, 401, **402**  
 acuminata, Penicillidia oceanica, 46, 356, 357, **392**  
*aegyptia*, *aegyptiaca*, Eucampsipoda, (= *E. hyrtlii*) 413  
 aequisetosa, Basilia, 45, 300, 301, **303**  
 afghanica, Basilia, 44, 199, **224**  
 africana, Eucampsipoda, 46, 412, **417**  
*africana*, Nycteribia latreillii, 69  
 albertsi, Cyclopodia, 46, 438, 441, **448**  
 allotopa, Nycteribia, 43, 51, 54, **55**  
 allotopoides, Nycteribia, 43, 51, 54, **60**  
 amiculata, Basilia blainvillii, 45, 300, 301, 304, **307**  
 anceps, Basilia juquiensis, 44, 249, **279**  
 annandalei, Stylidia, 43, 119, **122**  
 anomala, Basilia, 44, 248, **258**  
 ansifera, Basilia, 44, 196, 198, **226**  
 antrozoi, Basilia, 44, 248, 250, **254**  
 antrozoi group, Basilia, 44, 194, 247, **254**  
 arabica, Cyclopodia greeffi, 46, 441, **469**  
 Archinycteribia, 46, 49, **401**  
 arcuata, Dipseliopoda, 46, 428, **429**  
 armata, Stereomyia, 45, **339**  
 australis, Cyclopodia, 46, 438, 440, **450**  
 bakeri, Nycteribia, 43, 53, 55, **103**  
 Basilia, 44, 48, 49, 50, **192**, 199, 339  
 bathybothyra, Basilia, 44, 226, **228**  
 bathybothyra group, Basilia, 44, 193, 194, 197, **224**, 246, 300  
*bathybothyra* Penicillidia (misdet.), (= *B. ansifera*) 226, (= *B. daganiae*) 228, (= *B. pumila*) 237  
*bechsteinii*, Nycteribia, (= Nycteribia vexata) 112  
 bellardii, Basilia, 44, 248, **261**  
*bellardii*, Basilia (misdet.) (= *B. myotis*) 281  
 bequaerti, Basilia, 44, 248, 253, **262**  
 biannulata, Dipseliopoda, 46, 428, 429, **431**  
 biarticulata group, Stylidia, 43, 117, 119, **122**  
 biarticulata, Stylidia, 43, 118, 120, **122**  
 biloba, Stylidia, 43, 117, 120, **127**  
*biscutata*, Nycteribia, (= *N. latreillii*) 69  
 blainvillii blainvillii, Basilia, 45, 300, 301, **304**  
*blainvillii* Latreille, Nycteribia, (= ? Cyclopodia dubia), 469  
*blainvillii*, Nycteribia (misdet.) (= Stylidia integra), 153  
*blasii* Kolenati, 1856, Nycteribia (= *N. schmidlii*), 90  
*blasii* Kolenati, 1863, Nycteribia (= *N. kolenatii*), 67  
*blasii*, Nycteribia (misdet.) (= *N. latreillii*), 69  
 boardmanni, Basilia, 44, 248, 250, **263**  
*bombayensis*, Basilia, (= *B. pumila*), 237  
 borneensis, Basilia, 44, 195, 198, **217**  
 bougainvillensis, Cyclopodia, 46, 438, 440, 441, **450**  
 bouvieri, Basilia, 45, 196, 197, **290**  
 brachyacantha, Stylidia, 43, 119, **129**  
 brachythrinx, Cyclopodia, 46, 439, **482**  
*brevicauda*, Nycteribia, (= Basilia falcozi), 315, (= *B. troungtoni*), 336  
 brevipes, Basilia, 45, 301, 302, **308**  
 burmensis, Basilia roylui, 45, **299**  
 burrelli, Basilia, 45, 300, **310**  
 buxtoni, Penicillidia, 45, 355, 358, **374**, 397  
*calverti*, Basilia (= *B. forcipata*), 257  
*Camptopenicillidia* (= Penicillidia), 353  
 capensis, Nycteribia, 43, 52, 54, **83**  
 carteri, Basilia, 44, 249, 253, **271**  
*carteri* var., Basilia (= *B. currani*), 276  
 caudata, Stylidia, 43, 117, 120, **131**  
*Celeripes* (= Stylidia), 116, 122  
 ceylonica, Stylidia, 43, 119, 121, **136**  
 chinensis, Stylidia, 43, 119, **136**  
*chlamydophora*, Nycteribia (= Basilia roylui), 296  
 coeca, Hershkovitzia, 45, **346**  
 compar, Basilia, 45, 194, 196, **285**  
 Conotibia, 45, 49, 193, 194, **284**  
 conspicua group, Penicillidia, 45, 353, 354, **358**  
 conspicua, Penicillidia, 45, 352, 353, 355, 357, **358**  
 constricta, Basilia, 44, 249, 253, **273**  
 coronata coronata, Basilia, 45, 301, 302, **310**  
 corynorhini, Basilia, 44, 248, 254, **265**  
 costaricensis, Basilia, 44, 249, 253, **274**  
*Cratopenicillidia* (= Penicillidia), 353  
 currani, Basilia, 44, 250, **276**  
 curvata, Stylidia, 43, 118, 121, **137**  
 Cyclopodia, 46, 49, **437**, 439, 442  
 Cyclopodiinae, 46, **401**  
 daganiae, Basilia, 44, 196, 199, **228**  
 dentata, Nycteribia, 43, 51, 54, **61**  
 decipiens, Penicillidia, 45, 356, **370**  
 Dipseliopoda, 46, 49, **428**  
 dispar, Nycteribia, 285, **494**  
 dubia, Basilia, 44, 249, 253, **276**  
 dubia, Cyclopodia, 46, 439, 441, **469**  
 dufourii dufourii, Penicillidia, 45, 353, 355, 357, **362**  
 dunni, Basilia, 44, 249, **278**  
 echinata, Basilia, 45, 300, **313**  
 eilcenae, Basilia, 44, 195, 198, **219**  
 eileenae group, Basilia, 44, 194, 197, **217**  
 elongata, Nycteribia, **494**  
*ercolanii*, Nycteribia (= *N. vexata*), 112  
 Eremoctenia, 46, 49, 353, 354, **397**  
 Eucampsipoda, 46, 49, **410**  
 euxesta euxesta, Stylidia, 43, 119, 121, **140**  
*euxesta*, Nycteribia (misdet.) (= Stylidia ceylonica), 136  
 euxesta subsp., ?, **144**  
 exacuta, Nycteribia, 43, 52, 53, **86**  
 falcozi, Basilia, 45, 301, 302, **315**  
 ferrarii ferrarii, Cyclopodia, 46, 439, 442, 476, **477**  
 ferrisi, Basilia, 44, 250, 254, **278**  
 ferruginea, Basilia, 44, 249, 250, **259**



# INDEX

- ferruginea group, Basilia, 44, 194, 247, **259**  
*fitzingerii*, Eucampsipoda (= *E. hyrtlii*), 413  
*flava*, Basilia, 45, **284**  
*fletcheri*, Basilia, 44, 196, 198, **231**  
*forcipata*, Basilia, 44, 248, 250, **257**  
*forcipata* group, Basilia, 44, 194, 247, **257**  
*formosana*, Nycteribia, 43, 52, 54, **62**  
*fraterna*, Styliidia, 43, 118, 120, **145**  
*frauenfeldii*, Penicillidia, (= *P. dufourii*), 362  
*fryeri*, Tripselia (= Basilia blainvillii), 300, 304, 307  
*fulvida* group, Penicillidia, 45, 353, 354, **368**  
*fulvida*, Penicillidia, 45, 354, 356, **368**  
*fulvida*, Penicillidia, (misdet.) (= *P. decipiens*), 370  
  
*glabra*, Basilia, 45, 196, **294**  
*greeffi*, Cyclopodia, 46, 439, 441, **465**  
*greeffi* group, Cyclopodia, 46, 439, 441, **465**  
*guimaraesi*, Basilia, 44, 250, **278**  
*Guimaraesia* (= Basilia), 192, 278, 281  
  
*halei*, Basilia, 45, 300, 302, **317**  
*heinrichi*, Penicillidia, 45, 355, 358, **377**  
*hermannii*, *Phthiridium*, Nycteribia, (= *Styliidia biarticulata*), 122  
*Herskovitzia*, 45, 48, 50, 193, 285, **345**  
*hindlei*, Styliidia, 43, 119, 121, **146**  
*hirsuta*, Basilia, 45, 300, 302, **319**, 339  
*hispida*, Basilia, 44, 195, 197, **199**  
*hoogstraali*, Styliidia, 44, 119, 121, **191**  
*hopei*, Cyclopodia (= *C. sykesii*), 444  
*horrida*, Basilia, 45, 300, 302, **322**  
*horsfieldi*, Cyclopodia, 46, 437, 438, 441, **452**  
*hughscotti*, Basilia, 44, 249, **278**  
*hyrtlii*, Eucampsipoda, 46, 410, 411, 412, **413**  
*hyrtlii*, Eucampsipoda (misdet.) (= *E. africana*), 417, (= *E. latisterna*), 420, (= *E. madagascarensis*), 423  
  
*inaequalis*, Herskovitzia, 45, **348**  
*incisa*, Styliidia, 43, 118, 121, **151**  
*inclita*, Cyclopodia, 46, 438, 440, **453**  
*indica*, Penicillidia, 45, 355, 357, **379**  
*indivisa*, Basilia coronata, 45, **313**  
*inermis*, Eucampsipoda, 46, 411, 413, **418**  
*inflapipes*, Cyclopodia, 46, 439, 442, **473**  
*inopinata*, Styliidia, 43, 118, **151**  
  
*insolita*, Nycteribia (= *N. allotopa*), 55  
*integra*, Styliidia, 43, 119, 121, **153**  
*italica*, Basilia, 44, 196, 198, **202**  
  
*japonica*, Nycteribia, 43, 51, 54, **65**  
*jenynsii* group, Penicillidia, 45, 354, **374**  
*jenynsii*, Penicillidia, 45, 353, 355, 358, **382**  
*jenynsii*, Penicillidia (misdet.) (= *P. indica*), 379, (= *P. oceanica acuminata*), 392, (= *P. oligacantha*), 393  
*juquiensis juquiensis*, Basilia, 44, 249, **279**  
  
*kolenatii*, Nycteribia, 43, 51, 54, **67**  
  
*latisterna*, Eucampsipoda, 46, 412, **420**  
*latiterna*, Nycteribia, 43, 52, 54, **88**  
*latreillii*, Nycteribia, 43, 51, 54, **69**  
*latreillii*, Nycteribia (misdet.) (= ? *kolenatii*), 67  
*latreillii* subsp., ?, Nycteribia, **73**  
*leachi*, Penicillidia (= *P. dufourii*), 362  
*Leptocyclopodia*, 46, 49, 437, 438, 440, **476**  
*leptothrinax*, Penicillidia, 45, 354, 355, 356, 357, **385**  
*lindbergi*, Nycteribia, 43, 53, 55, **115**  
*Listropoda*, *Listropoda* (= Nycteribia), 50, 67, 69, 78, 209, 211  
*longiseta*, Penicillidia (= Basilia majuscula), 233  
*longispinosa*, Basilia, 45, 301, 302, **323**  
  
*macracantha*, Cyclopodia, 46, 438, 441, **462**  
*macrura*, Cyclopodia, 46, 440, 442, **485**  
*madagascarensis*, Basilia, 45, 196, 197, **294**  
*madagascarensis*, Eucampsipoda, 46, 411, 413, **423**  
*magna*, Cyclopodia (= ? *C. horsfieldi*), 452  
*magnocula*, Basilia, 44, 195, 197, **204**  
*major*, Basilia, 45, 301, 302, **326**  
*majuscula*, Basilia, 44, 196, 199, **233**  
*maxima*, Styliidia, 43, 118, 121, 151, **155**  
*Megistopoda* Kolenati (= Penicillidia), 352  
*meridionalis*, Basilia, 44, 198, **236**  
*mexicana*, Basilia, (= *B. bellardii*), 261, (= *B. plaumanni*), 266  
*mindanaensis*, Styliidia, 43, 119, **158**  
*minor*, Cyclopodia, 46, 438, 440, **455**  
*minuta*, Nycteribia (= Cyclopodia ferrarii), 477  
  
*mirandaribeiroi*, Basilia, 45, 249, **279**  
*miramae*, Penicillidia, 45, 356, 357, **387**  
*monoceros*, Penicillidia, 45, 355, 357, **367**  
*monocula*, Basilia, 44, 195, 198, **206**  
*montaguei*, *montagui*, Nycteribia (= *N. vexata*), 112  
*multispinosa*, Basilia, 45, 301, 302, **327**  
*musgravei*, Basilia, 45, 300, **330**  
*myotis*, Basilia, 45, 250, 254, **281**  
  
*nana*, Basilia, 44, 195, 197, **209**  
*nattereri*, Basilia, 44, 195, 197, 209, **211**  
*nattereri*, Basilia (misdet.) (= *B. nana*), 209  
*nattereri* group, Basilia, 44, 194, 197, **199**  
*neamericana*, Basilia, 44, **266**  
*Neopenicillidia* (= Penicillidia), 353, 358  
*Neotripselia* (= Paracyclopodia), 290  
*nipponensis*, Acrocholidia, **495**  
*novaguineae*, Cyclopodia, **495**  
*nuditerga*, Styliidia, 43, 117, 120, **160**  
*Nycteribia*, 43, 48, 50, 51, 53, **55**  
*Nycteribiidae*, **47**, 48  
*Nycteribiinae*, 43, **50**  
  
*obliqua*, Cyclopodia, 46, 439, 442, **488**  
*oceanica*, Nycteribia (misdet.) (= Basilia falcozi), 315  
*oceanica oceanica*, Penicillidia, 45, 356, 357, **389**  
*octophthalma*, Archinycteribia, 46, **406**  
*oligacantha*, Penicillidia, 46, 356, 357, **393**  
*orientalis*, Eucampsipoda hyrtlii (= *E. latisterna*), 420  
*ornata*, Styliidia, 43, 118, **162**  
*orthotricha*, Cyclopodia, 46, 440, 442, **492**  
*ovalis*, Styliidia, 43, 118, 120, **163**  
*oxycephala*, Cyclopodia, 46, 438, 440, **457**  
  
*pachymela*, Penicillidia, 45, 354, 356, **370**  
*palawanensis*, Cyclopodia ferrarii, 46, **482**  
*papuensis*, Nycteribia, 43, 53, 55, **105**  
*Paracyclopodia*, 45, 49, 194, 195, 197, **290**  
*parilis* group, Basilia, 43, 50, 52, 53, **99**  
*parilis*, Nycteribia, 43, 53, 55, **99**  
*parvula*, Nycteribia, 43, 51, 53, **73**  
*parvuloides*, Nycteribia, 43, 51, 53, **77**  
*peali*, Penicillidia, **495**  
*pectinata*, Basilia, 44, 195, 198, **221**

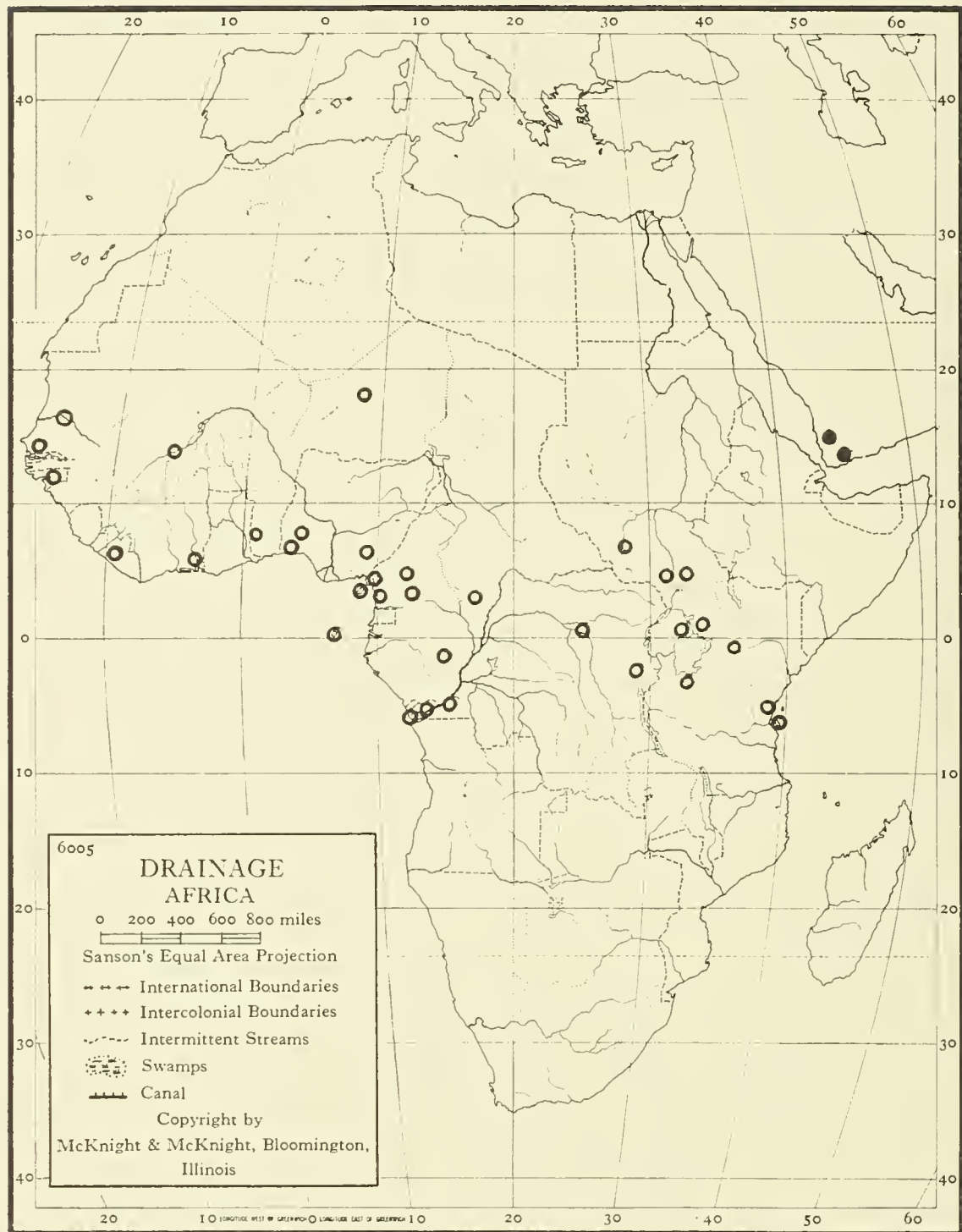
# INDEX

- pedicularia group, Nycteribia, 43, 50, 51, 53, **55**  
pedicularia, Nycteribia, 43, 51, 54, 67, **78**  
*pedicularia*, Nycteribia (misdet.) (= *dentata*), 61, (= *formosana*), 62, (= *capensis*), 83  
pembertoni, Cyclopodia, 46, 438, 441, **460**  
pembertoni group, Cyclopodia, 46, 438, **460**  
Penicillidia, 45, 48, 50, 339, **352**, 353, 354, 358, 397  
penthetoris, Eucampsipoda, 46, 412, 413, **423**  
peruvia, Basilia, 45, 249, 253, **282**  
peselefantis, Basilia, 45, 301, 302, **331**, 335  
philippinensis, Eucampsipoda, 46, 411, 413, **426**  
*philippinensis*, Eucampsipoda (misdet.) (= *E. sundaica*, male), 426  
phillipsi, Stylidia, 43, 118, 121, **165**  
*Phthiridium* (= Stylidia), 116, 122, 304  
phthisica, Stylidia, 43, 121, **168**  
pizonychus, Basilia, 44, 248, 250, **256**  
plaumanni, Basilia, 44, 248, 249, 253, **266**  
ponapensis, Cyclopodia, 46, 438, 440, **458**  
primitiva, Hershkovitzia, 45, 48, **345**  
progressa, Penicillidia, 46, 354, 356, 397, **398**  
*Pseudelytromyia* (= Basilia), 192, 282  
psiloteria, Stylidia, 43, 119, 120, **169**  
*pteropus*, Nycteribia (= Cyclopodia albertisii), 448  
pudibunda, Basilia, 44, 196, 197, **213**  
pumila, Basilia, 44, 196, 198, **237**  
*pumila*, Penicillidia fletcheri var. (misdet.) (= *B. ansifera*), 226  
punctata, Basilia, 44, 196, 198, **239**  
pygmaea, Nycteribia, 495  
quadrata, Basilia, 45, 301, **333**  
*reichenowii*, Nycteribia, (= Basilia blainvillii), 304  
rhodesiensis, Stylidia scissa, 44, **188**  
robusta, Basilia, 44, 196, 199, **241**  
*romanai*, Guimaraesia (= *B. currani*), 276  
*romanai*, Basilia (= *B. carteri*), 271  
rondanii, Basilia, 44, 248, 250, **257**  
rothschildi, Nycteribia, 43, 53, 54, 107  
rotundata, Stylidia, 43, 121, 172  
*rotundisquamata*, Basilia (= *B. majuscula*), 233  
roylii roylii, Basilia, 45, 196, 197, 290, **296**, 339  
*rubiginosa*, Cyclopodia (= *C. greeffi*), 465  
rugosa, Basilia, 45, 284  
sarasini, Nycteribia, 43, 52, 55, **108**, 110  
*sauteri*, Nycteribia, (= *N. parvula*), 73  
schmidlii group, Nycteribia, 43, 50, 52, 53, **83**  
schmidlii schmidlii, Nycteribia, 43, 52, 53, **90**  
scissa group, Stylidia, 44, 117, 119, **185**  
scissa scissa, Stylidia, 44, 119, 121, **185**  
scotti, Stylidia schmidlii, 43, **94**  
*scotti*, Basilia (= *B. majuscula*), 233  
seminuda, Basilia, 44, 198, **243**  
*senegalensis*, Penicillidia (nomen nudum), 353  
setosa, Dipseliopoda, 46, 335, 429, **434**  
siamensis, Stylidia euxesta, 43, **143**  
silvae, Basilia, 44, 249, 253, **269**  
similis, Cyclopodia, 46, 438, 441, **459**  
*similis*, Cyclopodia (misdet.) (= *C. inclita*), 453  
simulans, Cyclopodia, 46, 439, **493**  
solomonarum, Cyclopodia, 46, 439, 442, **474**  
speiseri, Basilia, 45, 250, 254, **282**  
*speiseri*, Basilia (misdet.) (= *B. ferri*), 278  
speiseri group, Basilia, 45, 194, 247, **271**  
spinifera, Penicillidia, 46, 355, 358, **395**  
spinosa, Nycteribia, 43, 52, 55, **110**  
Stereomyia, 45, 48, 297, **338**  
stichotricha, Nycteribia, **495**  
Stylidia, 43, 48, **116**  
styliidiopsis, Nycteribia, 43, 52, 54, **96**  
styligera, Stylidia, 43, 119, **175**  
*Stylopenicillidia* (= Penicillidia), 353  
sudanica, Stylidia scissa, 44, **189**  
sundaica, Eucampsipoda, 46, 412, 413, **426**  
sykesii, Cyclopodia, 46, 437, 438, 441, **444**  
sykesii group, Cyclopodia, 46, 438, 440, **444**  
szechuana, Stylidia, 44, 118, 120, **173**  
tainani, Penicillidia dufourii, 45, 355, 357, **367**  
tarsalis, Stylidia, **495**  
tecta, Stylidia, 44, 118, 120, **177**  
tenuis, Cyclopodia, 46, 439, 442, **471**  
tenuis group, Cyclopodia, 46, 439, 441, **471**  
tenuispina, Basilia, 44, 195, **243**  
*tolisima*, Nycteribia, (= *N. parilis*), 99  
tonkinensis, Stylidia, 44, 117, **179**  
torresi, Stylidia, 44, 119, 121, **180**  
traubi, Stylidia, 44, 118, 120, **182**  
travassosi, Basilia, 45, 249, 254, **284**  
triangularis, Nycteribia, 43, 52, 54, **81**  
Tripselia, 45, 48, 193, 194, **300**, 339  
triseriata, Basilia, 45, 302, 335  
troughtoni, Basilia, 45, 301, 302, **336**  
truncata, Cyclopodia, 46, 439, **476**  
varipes, Nycteribia, **495**  
*vespertilionis* Dufour, Nycteribia, (= Penicillidia dufourii), 362  
*vespertilionis* Montagu, Celeripes, (= Stylidia biarticulata), 122  
vexata, Nycteribia, 43, 53, 55, **112**  
*vexata*, Nycteribia (misdet.) (= *N. lindbergi*), 115  
wenzeli, Basilia, 44, 248, 250, **270**  
*westwoodii* Guérin-Ménéville, Nycteribia, (= Penicillidia dufourii), 362  
*westwoodii* Kolenati, Nycteribia (Penicillidia conspicua), 352, 353, 358

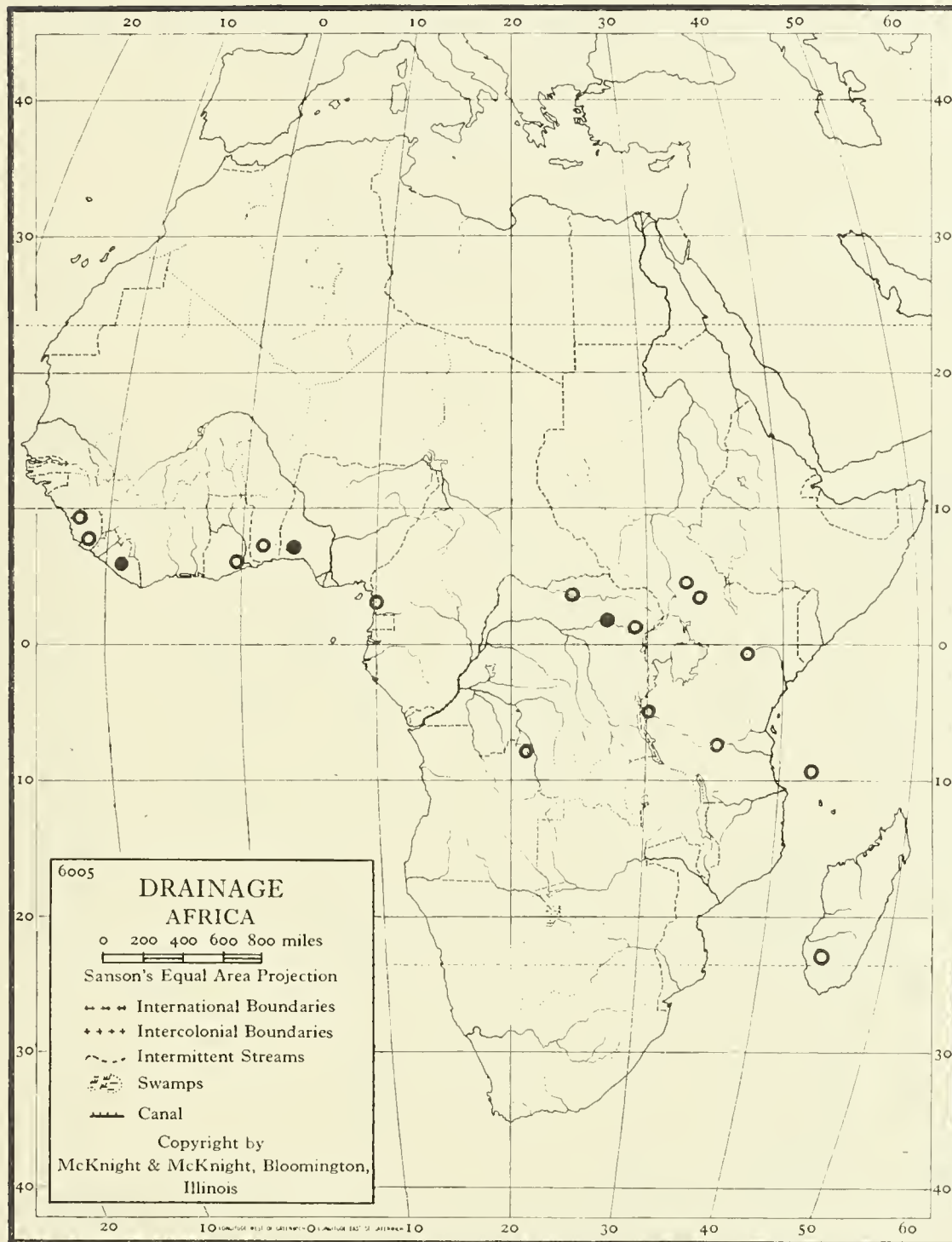




## MAPS OF DISTRIBUTION

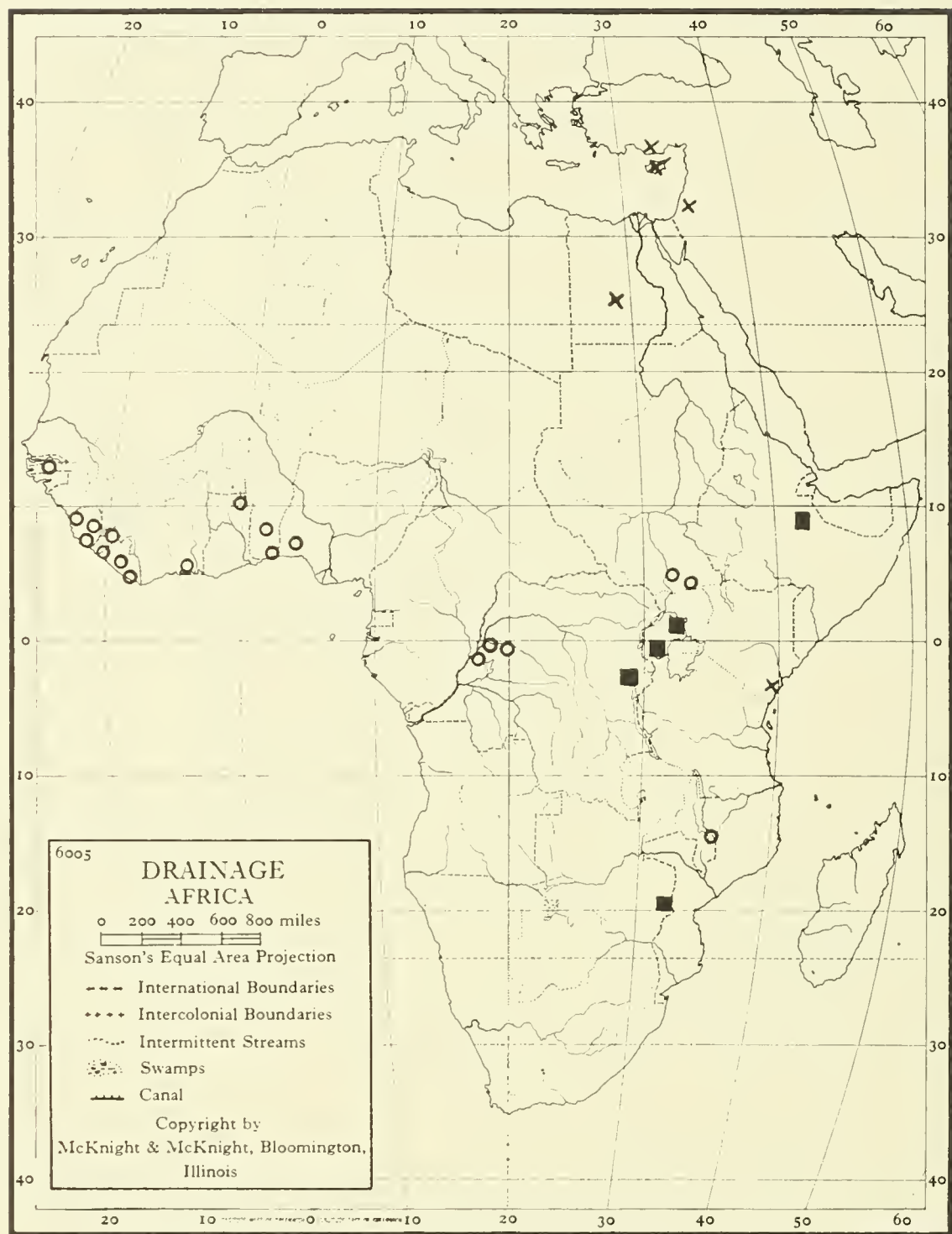


Map 1. Distribution of *Cyclopodia greeffi* ○ and *C. greeffi arabica* ●.

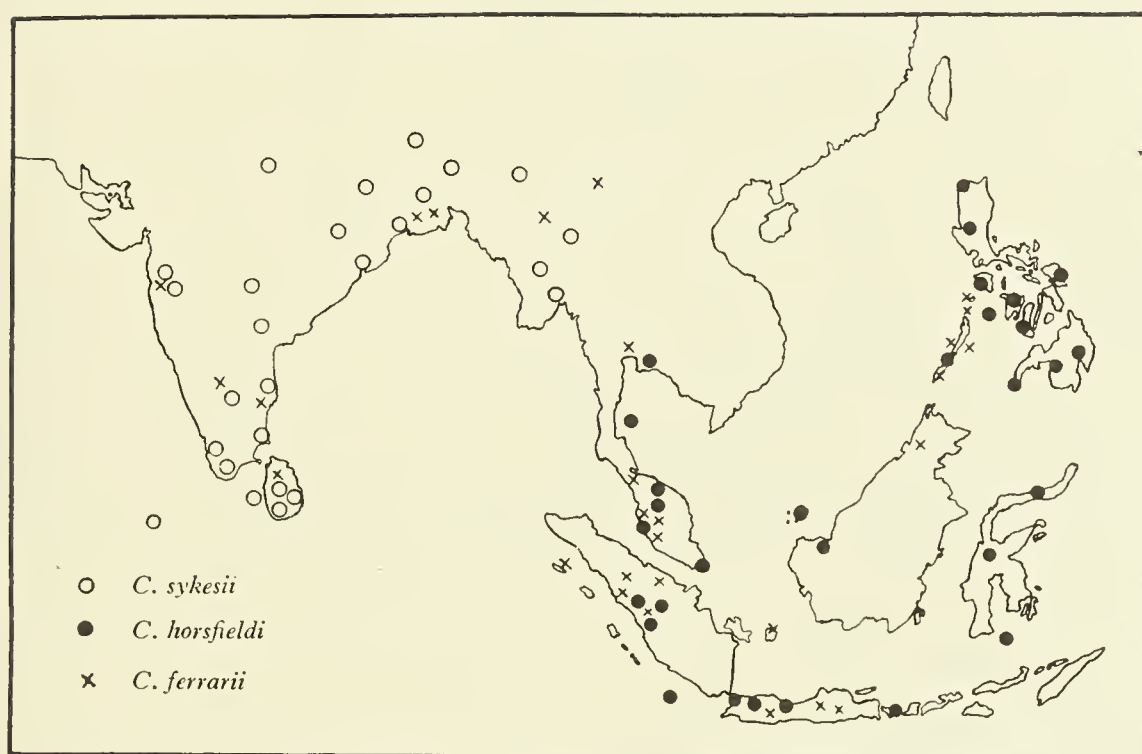


Map 2. Distribution of *Basilia (Tripselia) blainvillii* ○ and *B. (T.) aquisetosa* ●.

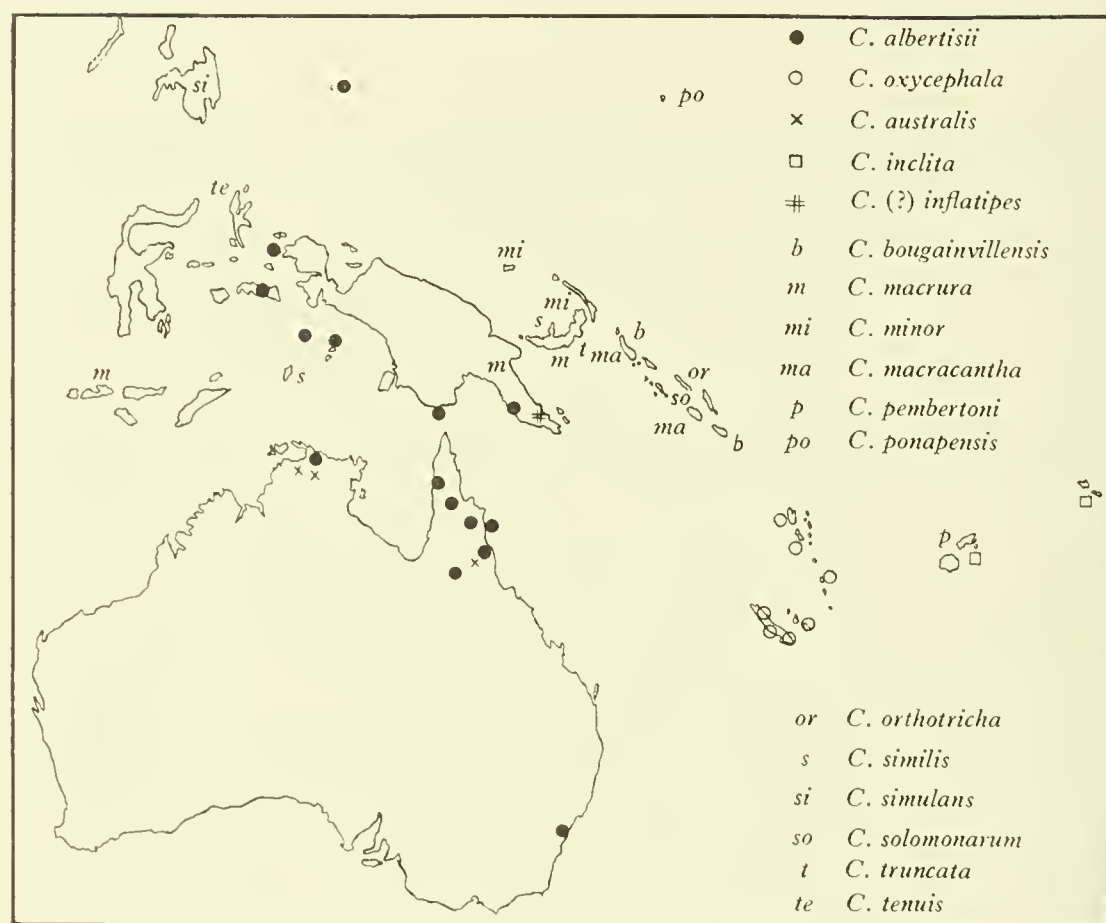




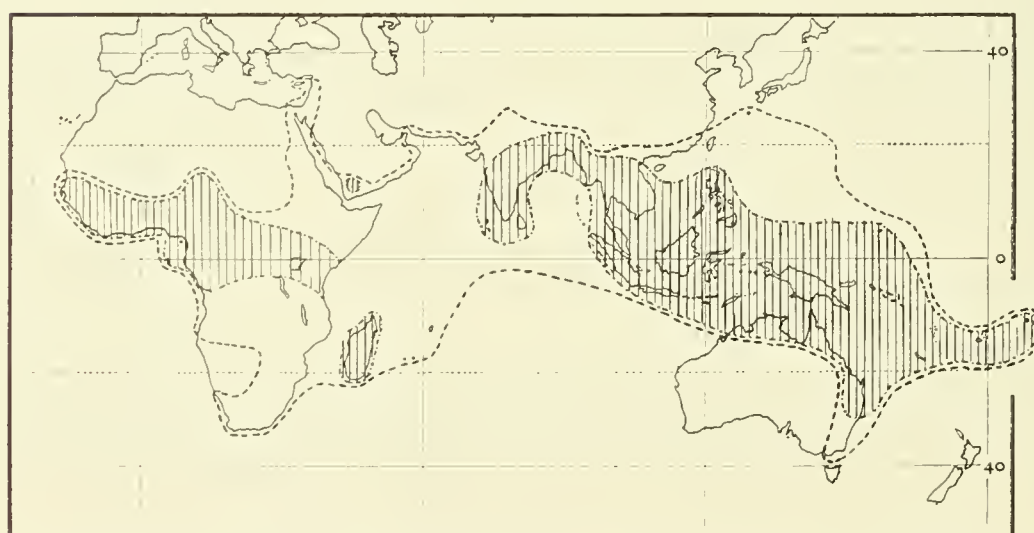
Map 3. Distribution of *Basilia ansifera* ○, *B. daganiae* × and *B. robusta* ■.



Map 4. Distribution of *Cyclopodia sykesii*, *C. horsfieldi* and *C. ferrarii* in the Oriental Region.



Map 5. Distribution of species of *Cyclopodia* in the Pacific Region.



Map 6. Distribution of the family Pteropidae (broken line) after Eisentraut, and of the genus *Cyclopodia* (shaded area).



# PLATES

PLATE 1

A

Subfamily Nycteribiinae. *Stylidia biarticulata* (Hermann).

♂ × 22.

Herzlia (Israel).

B

Subfamily Nycteribiinae. *Nycteribia latreillii* (Leach).

♀ × 22.

Kafr Kenna (Israel).

PLATE 1



A



B



PLATE 2

Subfamily Cyclopodiinae. *Dipseliopoda biannulata*  
(Oldroyd). ♀ × 26.

Thysville (Congo).

A comparison of Plates 1-2 with Table 2 (Differential characters of the subfamilies of Nycteribiidae) will show that the main characters on which the two subfamilies are separated are well illustrated on the photographs.

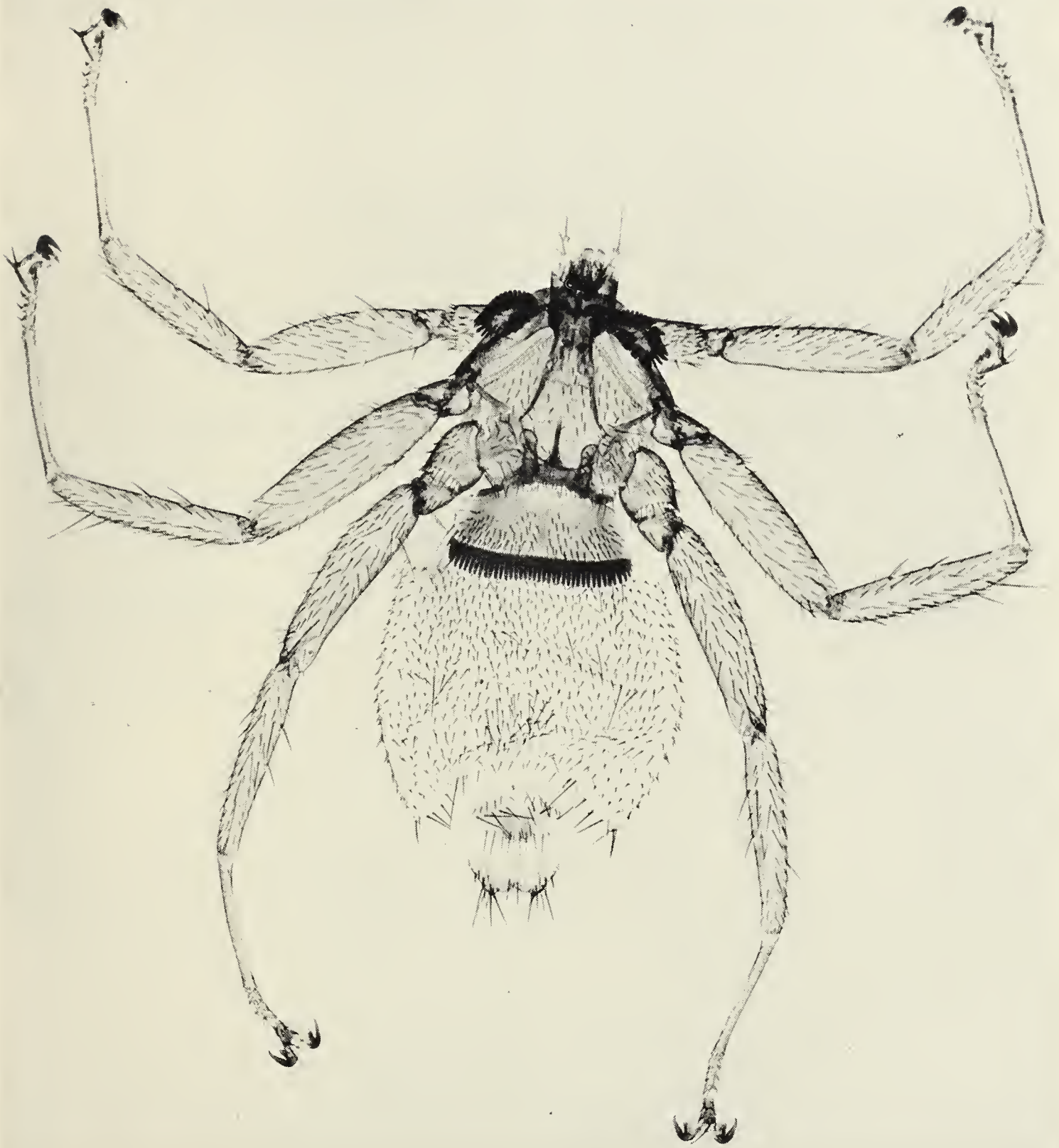


PLATE 3

A

*Cyclopodia horsfieldi* de Meijere. ♀ × 70.  
Bonerati Island (South of Celebes).

Head and thoracic ctenidium. Note the two lenses within each ocular frame  
and the thick spines of the combs.

B

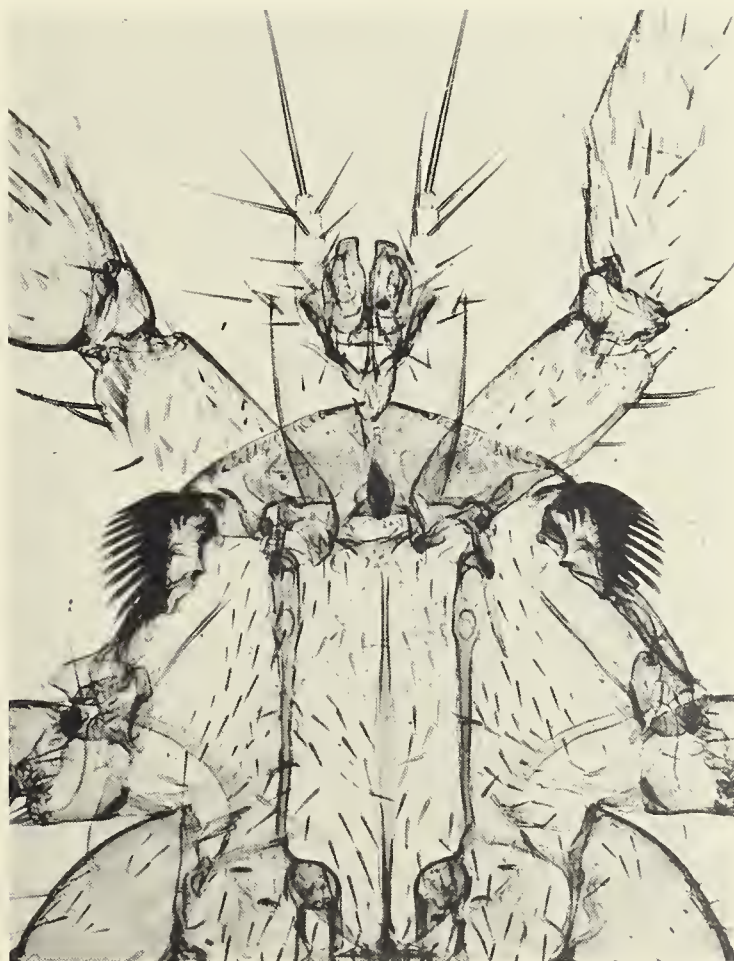
*Stylidia biarticulata* (Hermann). ♂ × 70.  
Herzlia (Israel).

Head and portion of thorax. Note the thoracic ctenidium, the anterior  
thoracic spiracles, and the mesonotum lying between the notopleural sutures.





A



B

PLATE 4

A

*Nycteribia kolenatii* Theodor & Moscona. ♀ × 140.

Henley-on-Thames (England).

Abdominal ctenidium. Note the spines of the ctenidium are articulated and are not spine-like outgrowths of the cuticle, but modified setae.

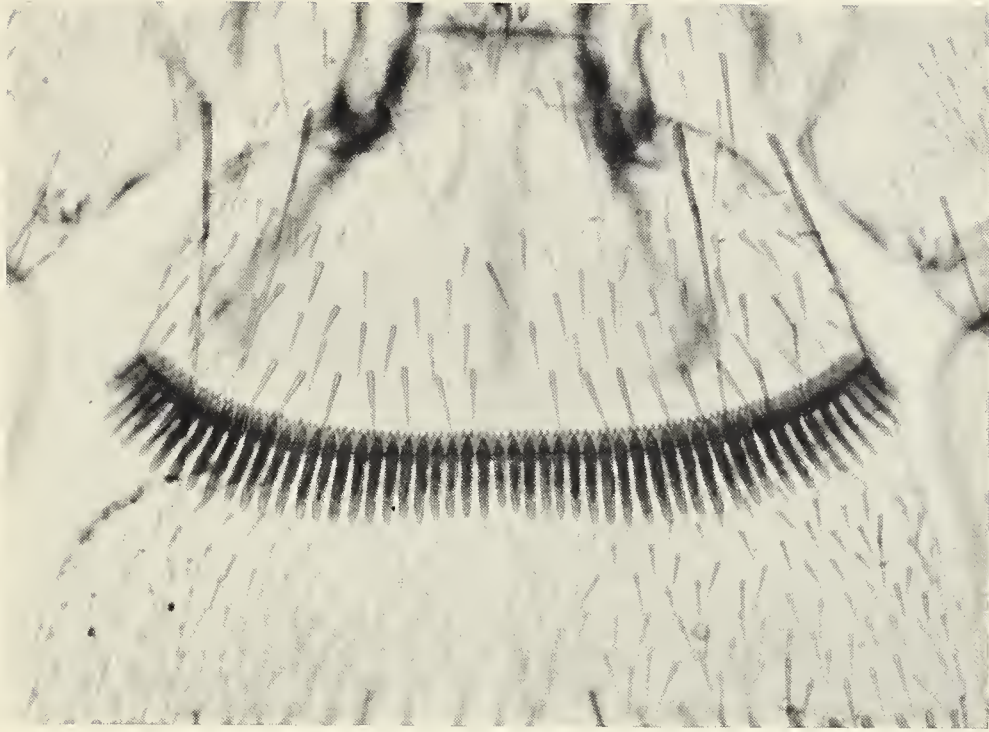
B

*Stylidia biarticulata* (Hermann). ♂ × 165.

Herzlia (Israel).

Genital area. Note the group of spines on the ventral surface immediately below the basal arc, the claspers and aedeagus.





A



B



PLATE 5

A

*Nycteribia latreillii* (Leach). ♀ × 165.

Kafr Kenna (Israel).

The genital plates. The faint outline of sternite 7 can be seen below the plates and sternite 6 above them.

B

*Dipseliopoda biannulata* (Oldroyd). ♀ × 165.

Thysville (Congo).

Genital plates.



A



B







B  
1461

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